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Secretariat

GENERAL

ST/SG/AC.10/16
20 July 1990

Original: ENGLISH

COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS
(Geneva, 3 - 12 December 1990)

PROVISIONAL AGENDA FOR THE SIXTEENTH SESSION*/

to be held in the Palais des Nations, Geneva,
starting at 10 a.m. on Monday, 3 December 1990

1. Adoption of the agenda

2. Election of officers

3. Resolution 1989/104 of the Economic and Social Council

4. Activities of international organizations concerned with regulations or recommendations on the transport of dangerous goods at an international level

5. Work of the Sub-Committee of Experts on the Transport of Dangerous Goods and recommendations made by it:

   (a) Reports of the first, second and third sessions of the Sub-Committee, in particular:

      (i) Revision of Division 4.1 including the classification of self-reactive substances;
      (ii) Revision of Class 2 (gases);
      (iii) Revision of Division 6.2 (infectious substances);
      (iv) Revision of provisions on packaging;
      (v) Use of proper shipping names and UN numbers for N.O.S. entries.

*/ The Composition of this Committee is limited (see resolutions 1488 (XLVIII) and 1973 (LIX) of the Economic and Social Council.

(b) Other proposals that remain outstanding from the agenda of the Sub-Committee:

(i) Editorial revision of the Manual of Tests and Criteria (second edition);
(ii) Matters concerning Class 1;
(iii) Other proposals.

6. New proposals for amendments to the Recommendations (Submitted since the third session of the Sub-Committee)

7. Publication of the revised Recommendations

(a) Seventh edition of the Recommendations (ST/SG/AC.10/1/Rev.7)

(b) Amendments to the Second edition of Tests and Criteria (ST/SG/AC.10/1/Rev.1)

8. Programme of work

9. Calendar of meetings for the biennium 1991/1992

10. Any other business

11. Report to the Economic and Social Council

UNITED
NATIONS

ST

Secretariat

GENERAL

ST/SG/AC.10/16/Rev.1
5 November 1990

ENGLISH
Original: ENGLISH and FRENCH

COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS
(Geneva, 3 - 12 December 1990)

REVISED PROVISIONAL AGENDA FOR THE SIXTEENTH SESSION*/

Revision 1

to be held in the Palais des Nations, Geneva,
starting at 10 a.m. on Monday, 3 December 1990

1. Adoption of the agenda

2. Election of officers

3. Resolution 1989/104 of the Economic and Social Council

4. Activities of international organizations concerned with regulations or recommendations on the transport of dangerous goods at an international level

5. Work of the Sub-Committee of Experts on the Transport of Dangerous Goods and recommendations made by it, together with subsequent proposals arising therefrom:

   (a) Class 1
   (b) Class 2
   (c) Division 4.1
   (d) Division 6.2
   (e) Packaging provisions
   (f) N.O.S. entries
   (g) Listing and classification
   (h) Other matters

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*/ The Composition of this Committee is limited (see resolutions 1488 (XLVIII) and 1973 (LIX) of the Economic and Social Council.

6. Other outstanding or new proposals to amend the Recommendations

7. Publication of the revised Recommendations

(a) Seventh edition of the Recommendations (ST/SG/AC.10/1/Rev.7)

(b) Manual of Tests and Criteria:

Editorial revisions;
Amendments to the second edition (ST/SG/AC.10/11/Rev.1)

8. Programme of work

9. Calendar of meetings for the biennium 1991/1992

10. Any other business

11. Report to the Economic and Social Council

READEX FICHE

UNITED
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Secretariat

GENERAL

ST/SG/AC.10/17
14 December 1990

Original: ENGLISH

COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS

REPORT OF THE COMMITTEE OF EXPERTS ON ITS SIXTEENTH SESSION
(3-12 December 1990)

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REPORT

1. The Committee of Experts on the Transport of Dangerous Goods held its sixteenth session from 3 to 12 December 1990. The session was attended by experts from the following countries: Canada, China, France, Germany, India, Italy, Japan, Netherlands, Norway, Poland, Sweden, Union of Soviet Socialist Republics, United Kingdom, United States of America. Observers from Austria, Belgium, Finland, Nigeria, Panama, Portugal, Spain and Switzerland participated in accordance with Rule 72 of the Rules of Procedure of the Economic and Social Council. A representative of the United Nations Environment Programme (UNEP) was also present. Representatives of the following specialized agencies and intergovernmental organizations also attended the session: International Labour Organisation (ILO); International Maritime Organization (IMO); International Civil Aviation Organization (ICAO); World Health Organization (WHO); European Economic Community (EEC); Central Office for International Railway Transport (OCTI); Universal Postal Union (UPU). Representatives of the following non-governmental organizations were also present: International Chamber of Commerce (ICC); International Chamber of Shipping (ICS); International Standardization Organization (ISO); International Air Transport Organisation (IATA); International Road Transport Union (IRU); European Council of Chemical Manufacturer's Federations (CEFIC); European Secretariat of Manufacturers of Light Metal Packagings (SEFEL); Permanent International Committee on Industrial Gases and Calcium-Carbide (CPI); Fibre Drum Technical Council (FDTC); International Confederation of Drum Reconditioners (ICDR); European Syndicate on Steel Drums (SEFA); Hazardous Materials Advisory Council (HMAC).

2. The session was opened by Mr. G. Dente, Director, ECE Transport Division.

ADOPTION OF THE AGENDA

3. The Committee of Experts adopted the revised provisional agenda prepared by the secretariat (ST/SG/AC.10/16/Rev.1).

ELECTION OF OFFICERS

4. Mr. L. Grainger (United Kingdom) and Mr. J. Monteith (Canada) were elected Chairman and Vice-Chairman respectively.

ADMINISTRATIVE MATTERS

5. The Chairman stressed the need to keep to the proposed timetable. This had been arranged so that changes to the text of the Recommendations would be dealt with during the first week and other matters would be left to the second week.

6. The Director of the Transport Division stated that production of the seventh revised edition of the Recommendations would be accomplished much more speedily than had been the case with previous editions. This was due to increased computerization, which had been helped by the contribution of ENEA/DISP, the Italian Committee for Energy Research. It was intended that members would receive at least one copy each very shortly after the meeting of the Economic and Social Council in May 1991.

RESOLUTION 1989/104 OF THE ECONOMIC AND SOCIAL COUNCIL

7. Resolution 1989/104 was approved by the Economic and Social Council at its session in May 1989. As a result it was hoped that some progress on the problems of staffing the dangerous goods unit would be made through a revised budget.

ACTIVITIES OF INTERNATIONAL ORGANIZATIONS CONCERNED WITH REGULATIONS OR RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS AT AN INTERNATIONAL LEVEL

8. Note was taken of document ST/SG/AC.10/R.271 where a member of the secretariat reported on his attendance at the seventy-seventh session of the International Labour Conference (1990). The representative of ILO then presented his document ST/SC/AC.10/R.338 which detailed subsequent action taken by his organization, including a proposed work plan. In elaborating about their future plans, the representative stated that there was no intention to duplicate or to conflict with the United Nations Recommendations. However, it was pointed out that while initial harmonization might be achieved, any ILO instrument would be fairly permanent while the United Nations Recommendations change every two years. The importance of a close contact between the United Nations experts and the ILO secretariat was acknowledged. This should be achieved by liaison between the secretariats and by the attendance of the ECE secretary at relevant ILO meetings.

9. The representative of ISO distributed an unofficial document which detailed relevant recent activities of his organization. In the case of gas cylinder labels, quality assurance programmes and flammability tests use had already been made of the ISO work during the current meeting. Again the need for close liaison between the two organizations was emphasized. The representative was requested to up-date his document in the next few months and to submit it formally to the Sub-Committee for their consideration during the next session.

10. The representative of the Commission of the European Economic Community made a statement describing recent developments within the Commission on the subject of dangerous goods transport. The hazards posed by the movement of such goods were a fundamental concern of the Commission, the problems had to be addressed positively and without any avoidable delay. Whatever technical requirements were agreed, they should apply to national transport as well as to transborder traffic. The Commission has respect for and confidence in the work of the United Nations Committee of Experts. However, no matter how skilfully the rules were prepared, the success of the work would depend on whether those rules were correctly applied. The main factor in this was the quality of the personnel employed and the standard of training they received. It was perhaps regrettable if the Commission had to proceed with its own measures but sometimes this was difficult to avoid. It was over one year since a new dialogue had been established between the Commission and the United Nations Committee but little significant progress had resulted. The Commission felt it had to proceed with its own measures on genetically modified organisms as they were necessary for worker protection. However it was hoped that the two organizations would be able to work together in the future.

11. The expert from France, as Chairman of WP15, welcomed the statement by the representative of the European Commission, in particular that the Transport Directorate (DG VII) in Brussels is now taking into account the international regulations on the transport of dangerous goods. He regretted that good collaboration had not been the case with other Commission Directorates. He recalled that DG III in Brussels was currently preparing a directive on pressure vessels which was liable to apply to tank-vehicles, tank-containers, cylinders and packagings of dangerous goods capable of withstanding a pressure of 0.5 bar or above, and that this would lead to a duplication of international regulations for the same apparatus, thus causing difficulties for manufacturers and users without any improvement in safety. He was surprised that there had been no official liaison with WP15 about ADR on that important subject.

12. The representative of the European Commission replied that he was aware of the problem. He said that the directive being prepared would be of the "new approach" type, in other words very general, and ought not to hamper the application of RID/ADR. He had taken steps so that official liaison should take place, and told the Chairman of WP15 that he would be invited ex officio to a meeting which would be held in Brussels on 4 to 5 February next.

13. The observer from IMO made a statement detailing the activities of his organization over the past two-year period. It was most unfortunate that a representative had not been able to attend the three sessions of the Sub-Committee, but this had been due solely to financial constraints. However, during that time IMO had incorporated into the IMDG Code the changes adopted at the last session of the Committee. It could now be said that the IMDG Code was 95% aligned with the United Nations Recommendations. Nevertheless, it was necessary to point out that IMO had adopted a new procedure for future changes. Urgent amendments affecting safety could be made at two-year intervals, less urgent but necessary amendments at four-year intervals, but any major revision would only be considered for incorporation after 10 years. Changes adopted at the current meeting would not be considered until January 1992 and would then not necessarily be put into the IMDG Code as urgent amendments. The 1990 edition of the Code had involved a complete revision and there was concern at the continual flow of amendments, some with little justification. The emphasis should now be on training rather than on minor improvements. IMO supported the work of the Committee and was alarmed at the actions of some other agencies in seeming to usurp the tasks of the Committee. This could lead to an undesirable proliferation of regulations.

14. The representative of ILO responded that, as far as his organisation was concerned, they fully appreciated IMO problems. Their draft convention was clearly worded as taking account of the United Nations Recommendations.

15. The expert from Italy expressed his concern at the IMO timetable. They were planning on major changes at 10 year intervals but the United Nations Committee was making changes every two years. Perhaps the Committee should reconsider, in agreement with ICAO, IMO and the RID/ADR Joint Meeting, its timescale? The experts from France and the United States of America shared that concern over the long delay before IMO would implement the next edition of the Recommendations. It was to be regretted that multimodal harmonization was to be held up in that way.

16. Closer liaison with the various modal organizations was clearly necessary. The Committee decided to request the secretariat to write to those organizations stressing that it was thought essential that they should be represented at all sessions of the Committee and its Sub-Committee in order that safe and harmonious regulations could be established and maintained world wide. It should be mentioned that not only would a secretariat member be welcomed at the United Nations sessions but also the Chairman or representative of their dangerous goods body.

17. The observer from ICAO made a statement on the work of his organization, which continued to support fully the efforts of the Committee. As far as possible ICAO believed in bringing problems to the United Nations rather than taking their own unilateral action; harmonization would be improved if all modes used that procedure. The decisions of the current session would be considered by the Dangerous Goods Panel at two sessions during 1991. Appropriate changes would be made to the next edition of the Technical Instructions for publication in 1992, coming into force on 1 January 1993. ICAO had just published the 1991 edition of its Emergency Reponse Guide and would soon have ready a revised series of training books.

18. The Chairman requested that, at future sessions of the Committee and Sub-Committee, if other organizations wished to make comprehensive statements, it would be preferable if they were submitted in writing beforehand. They could then be circulated and would reach a wider audience.

19. A representative of UNEP presented a review of recent work by his organization in the field of the transport of dangerous goods and related subjects. Many countries had now subscribed to the Basel Convention and progress was being made on a possible convention on the dumping of wastes. They were trying to integrate the concept of hazardous waste into existing regulations concerning the disposal and recovery of waste. Close co-operation existed between UNEP and ILO but it would be desirable to extend this to other interested agencies. They would favour an informal inter-agency meeting as soon as possible.

20. The Chairman pointed out that the Committee could not make a positive response to this suggestion at the present time. However this should not be taken as indicating any lack of interest in the work of UNEP and he invited UNEP to explain their ideas in writing to the secretariat.

21. The question was put as to whether if the Committee took no further action before the July meeting might that result in UNEP taking decisions without hearing the views of the Committee? The representative of UNEP assured the Committee that would not happen. The interim UNEP secretariat could not make any changes, that was up to member States.

WORK OF THE SUB-COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND RECOMMENDATIONS MADE BY IT, TOGETHER WITH SUBSEQUENT PROPOSALS ARISING THEREFROM

(a) Class 1 - Explosives

22. The Vice-Chairman of the Sub-Committee reviewed the work on explosives that had been accomplished during the meetings of the Sub-Committee. Progress had been made on the relationship between explosives and certain substances of

Division 4.1 on Test Series 7 and new tests proposed by the Union of Soviet Socialist Republics and agreement had been reached to rationalize the packaging methods in chapter 10. The new arrangement of amalgamating the Group of Experts on Explosives with the Group of Rapporteurs had worked satisfactorily, but adequate time for explosives matters would need to be allocated at the fourth and sixth meetings of the Sub-Committee.

23. Documents ST/SG/AC.10/C.3/R.35, -/R.36 and -/R.37, presented by the expert from the Union of Soviet Socialist Republics, had proposed new tests to be added to the Manual of Tests and Criteria. Members of the Sub-Committee had prepared a number of questions about those tests and they were listed in document ST/SG/AC.10/R.266. The expert from the Union of Soviet Socialist Republics had responded to the questions in document ST/SG/AC.10/R.321 and had prepared document -/R.320 to replace the proposal in document ST/SG/AC.10/C.3/R.35.

24. The expert from Norway proposed, in document ST/SG/AC.10/R.319, adding "plastics, solid" to packing method E137 as had been done for several other packing methods by the Sub-Committee. It was so agreed.

25. In document ST/SG/AC.10/R.294, the expert from the United States proposed a further entry for "Jet perforating guns". After some discussion the proposal was accepted.

26. The expert from Germany presented document ST/SG/AC.10/R.280 which contained a proposed new entry for Urea Nitrate. After an exchange of views the document was withdrawn and it will be replaced by a new document for consideration by the Sub-Committee.

27. Document ST/SG/AC.10/R.270 consists of a consolidated text of all the revisions to the Recommendations as contained in the reports of the first three sessions of the Sub-Committee. After making a few minor changes, the Committee adopted all those revisions that relate to Class 1.

28. The expert from the United Kingdom presented document -/R.290 which proposed undertaking a major revision of chapter 10. There was some support for it, although other experts cautioned against further major changes to the Recommendations at the moment. One suggestion was to make changes in two steps; first to amend some particular problem areas, and secondly to completely revise the chapter at a later date.

29. The following items of future work on Class 1 were proposed:

1. Listing and classification
2. Interface with other Classes
3. Provision for storage during the course of transport
4. Simplification of packing methods
5. Manual of Tests and Criteria:
   - improved presentation
   - bringing material up-to-date
   - introduction of new tests
6. Distinction between Division 1.3 and 1.4, also between 1.4C and 1.4S.

30. The proposals for new test methods, put forward by the expert from the Union of Soviet Socialist Republics in document ST/SG/AC.10/R.321 (which revised proposals in documents ST/SG/AC.10/C.3/R.36 and -/C.3/R.37) and -/R.320, were studied by a small drafting group. As a result of this work the Committee was able to adopt two new tests (impact and friction) for insertion in the Manual of Tests and Criteria. A third test (DDT) will be revised further and a new document submitted to the Sub-Committee.

(b) Class 2 - Gases

31. Document ST/SG/AC.10/C.3/R.118, introduced by the expert from Canada, proposed a modified classification for Anhydrous Ammonia. After some discussion a new classification for the substance was agreed.

32. Document ST/SG/AC.10/R.276 concerning reduced size labels for gas cylinders was presented jointly by the observers from CPI and HMAC, under the sponsorship of Germany. After an exchange of views a modified proposal was adopted to become a new paragraph 13.4.9.

33. The Committee considered document ST/SG/AC.10/R.312 which had been prepared jointly by the experts from Canada and the United States of America. This document consolidated the revision to the provisions for Class 2, as developed at the three sessions of the Sub-Committee. A number of corrections and improvements were made to the proposed text.

34. The observer from IMO pointed out that there were a number of differences between the proposed revision of chapter 2 and the gas entries in the IMDG Code. It was agreed that that was regrettable, particularly as it affected multimodal tank transport. IMO was invited to prepare a document identifying those differences for the Sub-Committee.

35. In relation to the proposed paragraph 1.17.2 (c), the expert from the United States of America gave his opinion that any effects caused by refrigerated gases, due to their low temperature, should not be considered as corrosive effects.

36. Document ST/SG/AC.10/R.336 presented by the expert from the United States of America, proposed a re-classification of three gases. The changes were adopted. He also proposed, in document ST/SG/AC.10/R.298, a change to the flammability test requirements. After including a reference to ISO Standard 10156-90, this was adopted.

37. The expert from Germany presented an unofficial paper concerning the corrosive effect of certain gases. It was agreed that this should be considered during the next biennium and a formal document should be prepared.

38. Document ST/SG/AC.10/C.3/R.72/Rev.2 had been prepared by the experts from the Netherlands and the Union of Soviet Socialist Republics and two proposals were adopted. Some of the suggestions in the paper had been incorporated into document ST/SG/AC.10/R.312.

39. The Committee agreed that document ST/SG/AC.10/R.312, with the adopted changes mentioned above, should replace all the existing provisions for Class 2; except that some minor changes concerning aerosols were required.

40. Documents ST/SG/AC.10/C.2/R.671, -/R.672 and ST/SG/AC.10/C.3/R.72/Rev.2 should be further considered during the next biennium. Document ST/SG/AC.10/C.2/R.604 was withdrawn in the light of decisions already taken.

41. The expert from Italy regretted that the Committee had made some changes to the classification of gases on the basis of alignment with the IMDG Code. Data sheets had not been provided, which would have been the correct procedure.

42. Two amendments to rearrange the provisions for aerosols were presented in an unofficial paper. These proposals were seen to be of an editorial nature and were adopted.

(c) Division 4.1 - Flammable solids

43. The observer from IMO drew attention to the policy adopted by his Organization of not making major changes to the IMDG Code at intervals of less than 4 years or complete revisions at intervals of less than 10 years. The requirements for Division 4.1 had been revised for the amendment to the IMDG Code which came into force on 1 January 1991; IMO would be reluctant to make further changes to that Division. In any case the proposed generic entries for Division 4.1 were of a similar form to those just introduced for Division 5.2, so it would be preferable to see how the system worked in practice for Division 5.2 before extending it to other divisions.

44. Moreover, IMO felt that the proposals were not fully developed. For instance the medical first aid aspects of the new entries for Division 4.1 had not been considered.

45. The observer from OCTI pointed out that his Organization was in a similar position as their regulations would be amended in 1992 so as to align Class 4.1 with the new IMDG Code. A further change would not be made for some years.

46. The Chairman responded by pointing out that the proposed changes only affected a part of Division 4.1. It was regrettable that IMO had not been represented at any of the meetings of the Sub-Committee and had not made their comments earlier. The Sub-Committee had spent a lot of time developing those changes and the Committee should bring this work to a conclusion. It would be left for each mode to decide when to introduce any new recommendations into their regulations. If IMO saw a need to look at the medical first aid aspects of the new entries, this could either be dealt with by IMO itself or written proposals could be put before the Sub-Committee.

47. Document ST/SG/AC.10/C.3/R.126 concerning screening tests, was briefly introduced by the expert from Japan. However, he announced his intention to replace it with a new document for consideration by the Sub-Committee.

48. The expert from Japan then presented an informal paper suggesting that Azodicarbonamide does not meet the definition of a self-reactive substance and proposing to delete this entry from chapter 2. The Committee recognized that this was a related rather than a self-reactive substance, although criteria for related substances had not yet been established. The proposal was not adopted.

49. The expert from the Netherlands presented document ST/SG/AC.10/C.3/R.138 concerning a data base which was intended for information only.

50. The expert from France explained that his document ST/SG/AC.10/C.3/R.148 contained the justification for using a temperature of 75° C in the definition of self-reactive substances. That temperature had been accepted by the Sub-Committee and the Committee made no objection to its use.

51. The Chairman drew attention to the documents which dealt with the introduction of generic entries for self-reactive substances. Document ST/SG/AC.10/R.268 was the report of the Working Group on self-reactive substances, -/R.300 detailed some consequential amendments which would be necessary, -/R.310 proposed an extended table 14.2, while -/R.335 listed some possible improvements to the proposed text.

52. The observer from CEFIC questioned the deletion of paragraph 14.1.3. The Committee decided that, although this paragraph might not be strictly necessary, it would be preferable to retain it.

53. In describing the meaning of the term "related substances", the Committee agreed to use the wording contained in document -/R.300.

54. A proposal to include provision for self-reactive substances to be transported in tanks was defeated on the grounds that most of those substances were solids and that there had been no experience of using tanks.

55. The Committee compared the proposed lists of currently assigned self-reactive substances as shown in documents -/R.300 and -/R.310. It was agreed to adopt the former.

56. It was felt to be unnecessary to require a classification notification to be sent to the competent authority of the country of destination. This was not required for Division 5.2 and self-reactive substances could be dealt with in the same way.

57. The Committee adopted the new provisions for self-reactive substances as shown in document -/R.268 and modified by documents -/R.300 and -/R.335, with a few minor changes.

58. A small drafting group edited the proposals for self-reactive substances contained in documents ST/SG/AC.10/R.268, -/R.300 and -/R.335 and made further minor revisions. This consolidated text, representing a complete amendment to the provisions for self-reactive substances, was adopted by the Committee.

(d) Division 6.2 - Infectious substances

59. The expert from Canada considered that the new special provision for toxins needed clarification. New wording was proposed in document ST/SG/AC.10/R.283 and the Committee agreed that this would make the meaning clearer.

60. The Sub-Committee had already discussed at length the need to include in the Recommendations provisions for the transport of genetically modified organisms or micro-organisms, but without reaching any firm decisions. The expert from Italy put forward, in document ST/SG/AC.10/R.315, a proposal for

an appropriate new entry in chapter 2 together with supporting text in other chapters. A number of other possibilities were explored and eventually a text was developed which was acceptable to a majority of the Committee.

(e) Packaging provisions

61. Document ST/SG/AC.10/R.272, presented by the expert from the United States, described difficulties in maintaining the required humidity for the testing of certain packagings. It was decided to solve this problem, not in the way proposed, but by adding an appropriate Note to paragraph 9.7.2.3. A similar change would be made in the test requirements for fibreboard IBCs.

62. In document ST/SG/AC.10/R.289, the expert from the United Kingdom presented a revised proposal to permit the use of shrink- or stretch-wrapped trays for limited quantities of dangerous goods this being a sturdy and widely used form of outer packaging. With some words added, the proposal was adopted by a vote of 9 to 3.

63. The experts from Germany, the Netherlands and the Union of Soviet Socialist Republics expressed their concern at this decision as neither RID/ADR nor IMO allow the use of untested shrink- or stretch-wrapped trays. On the contrary IMO only allows untested packagings for UN Nos. 1133, 1210, 1263 and 1866 under very specific requirements.

64. Document ST/SG/AC.10/R.297, from the United States, sought to clarify the wording proposed by the Sub-Committee for the new "SP" packagings. The Committee developed other wording which avoided any ambiguity. The expert from Sweden then pointed out that the letters "SP" were already in use to denote the Swedish Testing Institute and so should not be used in the UN marking. To avoid confusion, it was agreed to use the letter "V" instead.

65. The expert from the Netherlands presented document ST/SG/AC.10/R.302 which sought to revise the requirements for the testing of combination packagings as developed by the Sub-Committee. After some discussion the proposal was defeated.

66. In document ST/SG/AC.10/R.303 several suggestions were put forward concerning the application of the UN mark to tested packagings. Although those suggestions were not adopted, it was recognized that a problem existed in relation to the position of the mark and this would need to be looked at again.

67. In document ST/SG/AC.10/R.337 the expert from the United Kingdom sought to rescind the decision of the Sub-Committee concerning the drop test for composite IBCs. However, a majority of the Committee felt the decision should stand.

68. The leak testing of every packaging manufactured on a high speed production line is difficult to achieve satisfactorily. A solution was proposed in document ST/SG/AC.10/R.339 whereby a quality assurance system (based on ISO standards 2859 and 9002) could be used and it would not then be necessary to test every single packaging. Although recognizing that a problem

existed, a number of experts were reluctant to abandon the established principle of 100% testing. It was agreed that the Sub-Committee should consider a revised proposal which took into account the comments made.

(f) N.O.S. entries

69. The Sub-Committee had agreed to the introduction of a number of new N.O.S. entries into chapter 2 (as shown in document ST/SG/AC.10/R.270), many of these making a distinction between organic and inorganic substances. In document ST/SG/AC.10/R.334 the expert from the United States of America argued that such a distinction was meaningless in the case of flammable solids, N.O.S. A majority of the Committee felt that the distinction should be maintained so as to differentiate between possible different emergency response procedures.

70. This decision led on to the problem of whether the more general entry of "Flammable solids, N.O.S." (UN No. 1325) should be retained. It was eventually agreed that the best solution was to change the entry, as it exists in the sixth edition of the Recommendations, to read "Flammable solids, organic, N.O.S."

71. The expert from the United States expressed his concern over the action of the Committee. He felt that it would be very difficult to implement such a major change into the United States' regulations until a corresponding change was adopted and implemented by IMO.

72. In document ST/SG/AC.10/R.333, the expert from the United States of America suggested that a number of the proposed new N.O.S. entries for pyrophoric substances were not really necessary. The Committee agreed with that view and all eight proposed entries in document -/R.333 will not be put into chapter 2. It was also agreed that suitable additions should be made to table 12.2 for solutions of Division 5.1.

73. The Committee discussed provisions for the transport of solids containing flammable liquids or other dangerous goods. Such provisions would be directly applicable to the transport of some wastes, such as contaminated soil. The expert from the United States of America presented in document ST/SG/AC.10/R.299 proposals to address the problem. With some modification the proposals were adopted.

74. The Committee examined proposals for modifying the treatment of N.O.S. entries in the published Recommendations. These were contained in document ST/SG/AC.10/R.306 of the expert from the Netherlands and document ST/SG/AC.10/R.277 of the observer from ICAO. It was agreed that the book of Recommendations would be more "user friendly" by making the following changes:

1. Table 13.3 to be deleted;

2. Those N.O.S. entries required to be used with a technical name to be indicated in chapter 2 by an asterisk or other suitable symbol;

3. A new appendix listing all N.O.S. entries and appropriate generic entries from chapter 2 to be inserted between the main body of the Recommendations and the Index.

The expert from the Netherlands offered to prepare the new Appendix for the secretariat.

75. Documents ST/SG/AC.10/R.326 and -/R.327 proposed some changes to the existing N.O.S. entries. The proposals in the first paper were agreed and those in the second paper were not accepted.

(g) Listing and Classification

76. Proposals concerned with the transport of controlled substances were put forward by the expert from the United Kingdom in document ST/SG/AC.10/C.3/R.109 and by the expert from Canada in document ST/SG/AC.10/R.284. Based on these documents, suitable additions to chapters 2 and 3 were developed.

77. The new entry proposed in document ST/SG/AC.10/C.3/R.29 was agreed. The report of the Sub-Committee's Working Group contained in document ST/SG/AC.10/R.267 was noted. The changed entry proposed in document ST/SG/AC.10/R.274 was accepted with a modification to chapter 12. Other changes to listing and classification proposed in documents ST/SG/AC.10/R.274, -/R.275, -/R.279, -/R.286 and -/R.293 were adopted. However the proposal in document ST/SG/AC.10/R.296 was not accepted.

78. Document ST/SG/AC.10/R.311 addressed the problem of substances named in chapter 2 but where, due to their physical or chemical composition, they do not meet the criteria for the class or division listed. The changes proposed were amended by the Committee and then adopted.

79. The observer from OCTI suggested a text to be added to chapter 1 to assist in the classification of mixtures. However, it was felt that this did not solve all the problems with mixtures and a solution would have to be sought during the next biennium. It was pointed out that the Committee had decided to create entries in chapter 2 which distinguished between organic and inorganic substances but there was no guidance for classifying a mixture of organic and inorganic substances.

80. A proposal for a further new entry in chapter 2, presented in document ST/SG/AC.10/R.301, was accepted by the Committee. Listing and classification proposals in documents ST/SG/AC.10/R.318, -/R.325, -/R.331 and -/R.332 were rejected. Listing and classification proposals in documents -/R.301, -/R.314, -/R.323 and -/R.328 were accepted, the last with a slight modification.

(h) Other matters

81. The Sub-Committee had, at its first session, agreed on a limitation to the degree of filling for tank-containers. In document ST/SG/AC.10/C.3/R.85 the expert from the Netherlands proposed a different restriction. It was pointed out that the United Kingdom marine authority had recently completed an extensive study of the subject and perhaps it would be preferable to wait until their report could be studied. The observer from IMO said that the report would be discussed at the next meeting of their CDG Sub-Committee. After some discussion the Committee confirmed the wording previously agreed by the Sub-Committee.

82. The expert from the United Kingdom expressed surprise at that decision. He felt it would be necessary for the Committee to return to the subject but this should be after the IMO meeting.

83. Document ST/SG/AC.10/R.221 from IMO had been discussed at the last session of the Committee. One outstanding item from that paper dealt with an inconsistency between the United Nations Recommendations and the IAEA Regulations. The United Nations required the UN number and the proper shipping name to be marked on every package but IAEA has no such requirement. It was agreed that harmonization should be sought between the two sets of rules, although the security implications of increased use of the name "radioactive" should not be overlooked. The secretariat was asked to contact IAEA with a view to developing suitable proposals for the United Nations Recommendations and/or the IAEA Regulations.

84. The Committee noted document ST/SG/AC.10/R.269, prepared by the secretariat, which recorded some discussions at the third session of the Sub-Committee.

85. The expert from Germany presented document ST/SG/AC.10/R.281 in which he suggested modifying the way the new term "water-reactive substances" would be introduced. This was seen to be a desirable improvement and was adopted.

86. In document ST/SG/AC.10/R.288 the expert from the United Kingdom suggested a change to the provisions for subsidiary risk labels, which at the moment were not always required for Packing Group III. If a Packing Group III hazard was the primary risk a label was needed, so why not require a label if that hazard was the subsidiary risk? Some experts felt that such a change would result in an undesirable proliferation of labels, particularly for the subsidiary risk of Division 6.1. Some such packages were already required by IMO to bear the "marine pollutant" label. As the proposal involved a major change, it was agreed that it should be left for further discussion by the Sub-Committee.

87. The expert from the Netherlands proposed (in document ST/SG/AC.10/R.305) the addition of a new paragraph in chapter 1 concerning the principles on which generic entries should be based. There was some support for the proposal but it was felt that modifications to the wording were necessary. A revised document will be prepared for the Sub-Committee.

88. Documents ST/SG/AC.10/R.324 and -/R.340 concerned minor amendments to the Recommendations. After a brief discussion document -/R.324 was withdrawn and the proposals in document -/R.340 were agreed.

89. In document ST/SG/AC.10/R.329 a proposal was made to alter the Sub-Committee decision about the temperature to be used as a dividing line between liquids and solids. There was some sympathy for the proposal but it was felt preferable to adopt the text of the Sub-Committee as shown in document ST/SG/AC.10/R.270.

90. The changes to the Recommendations developed at the three sessions of the Sub-Committee had been consolidated into document ST/SG/AC.10/R.270. Some editorial amendments to the sixth revised edition were presented in document ST/SG/AC.10/R.317 and they were all accepted. Two classification changes

shown in document ST/SG/AC.10/R.270 had been placed in square brackets awaiting a final decision by the Committee. It was agreed to confirm those entries so that they would be in line with action already taken by IMO and RID/ADR.

91. The expert from Canada regretted that yet again re-classification had been done without data sheets being available. The Chairman expressed the hope that at future sessions classification proposals would not be put forward without data sheets.

92. The Committee then adopted the whole of document ST/SG/AC.10/R.270, apart from those changes mentioned elsewhere in this report.

93. However, the Committee agreed on reflection not to add the proposed new special provision to the entry for Urea Hydrogen Peroxide (UN No. 1511).

94. In view of the considerable changes being made to the list of dangerous goods and elsewhere, the Committee felt it might be a good time to consider some other desirable improvements. Thus it was agreed that the following changes should be made:

(1) the N.O.S. proper shipping names which included the words "liquids" or "solids" should be changed to "liquid" or "solid";

(2) if the word "substance" appeared in a "liquid" or "solid" N.O.S. entry, it should be deleted;

(3) the word "metallic" where applied to packagings, should be replaced by "metal";

(4) introductory Note 2 to the Index should be changed to show that the letters "N.O.S." would not be used in determining the alphabetical order.

OTHER OUTSTANDING OR NEW PROPOSALS TO AMEND THE RECOMMENDATIONS

95. It was agreed that a number of documents under this agenda item should be deferred for discussion by the Sub-Committee, namely: documents ST/SG/AC.10/C.3/R.60/Rev.1, -/C.3/R.63, -/C.3/R.101, -/C.3/R.101/Corr., -/C.3/R.132.

96. The introduction of a "container packing certificate", as proposed by the expert from the United Kingdom in document ST/SG/AC.10/C.3/R.111, was seen as desirable by some experts. The view was also expressed that extra documents should only be introduced if really essential. It was agreed that the proposal, together with a related proposal in document ST/SG/AC.10/R.313, needed further discussion by the Sub-Committee.

97. The expert from Germany suggested (in document ST/SG/AC.10/R.131) an addition to the definition of "substances liable to spontaneous combustion". While that addition might be technically correct, the Committee felt that there was not sufficient justification to alter a basic definition.

98. In document ST/SG/AC.10/R.273 presented by the observer from HMAC, a proposal was put forward for the inclusion in the Recommendations of provisions for training. The Committee welcomed this document as they recognized the need to make recommendations on the subject. Indeed the lack of such provisions had been a criticism of the United Nations Recommendations made by the ILO. Some modifications were made to the proposal and it was then adopted for inclusion in chapter 1.

99. The expert from Canada proposed, in document ST/SG/AC.10/R.285, some changes to the provisions for Lithium batteries. As the document was quite detailed he suggested that it be held over to the next session of the Sub-Committee.

100. Document ST/SG/AC/10/R.287, presented by the expert from the United Kingdom, suggested an improved presentation of the provisions for labels which was adopted. While some experts wished to take the opportunity to revise the existing requirements, it was eventually agreed not to change them for the time being.

101. The observer from IMO said he thought the provisions for Class 7 placards did not completely agree with the IAEA Regulations. The secretariat was requested to investigate the matter.

102. Minor changes to the Recommendations were proposed in documents ST/SG/AC.10/R.292, -/R.304, -/R.307 and -/R.309. After some discussion the proposal in document ST/SG/AC.10/R.304 was withdrawn, while the proposals in the other documents were adopted.

PUBLICATION OF THE REVISED RECOMMENDATIONS

103. Referring to document ST/SG/AC.10/C.3/R.147 the expert from the Netherlands stated that he had agreed in principle to the decisions taken on N.O.S. entries for the divisions of Class 4 and for Division 5.1. However, he considered this as an interim measure pending a further detailed development of a generic entry system in the future. He then suggested a rational numbering system for the new N.O.S. entries, which would indicate the relevant Division. The Committee decided that such a partial change from the current random system would only cause confusion and could not be accepted at the moment.

104. The expert from the Netherlands felt that in developing the Recommendations, the following points needed to be stressed:

(1) representatives of all modes should be present at Sub-Committee sessions, preferably with a mandate from their organizations. They would be in a position to point out the consequences of decisions that might be taken;

(2) the Committee should assist in harmonization by putting forward a scheme of problems with priority for their solution;

(3) proposals brought up for discussion at modal meetings but which have multi-modal implications should be passed first to the Committee for possible amendment to the Recommendations.

105. A member of the secretariat presented examples of improved printing types and arrangements which could be used for the next edition of the Recommendations, these would give greater clarity and reduced length. The Committee agreed that such improvements would be welcomed at a suitable time but would not like the secretariat to embark on any action which would delay publication of the next edition.

106. It was acknowledged that an editorial re-arrangement of the list of dangerous goods would eliminate many wasted lines. This change would be made some time but it might not be possible for the next edition.

PROGRAMME OF WORK

107. The following programme of work for 1991-1992 was adopted:

(a) Matters concerning Class 1 (4)

(b) Review of chapters 9 and 16, including (4)

metal drum reprocessing (ICDR)

leakproofness testing/quality assurance (SEFEL)

compatibility testing (Germany)

solid/liquid definition (CEFIC)

certain IBCs - Packing Group I (United Kingdom)

vibration test (United States of America)

stack test (FDTC)

(c) Review of chapter 13 (United States of America, United Kingdom) (5)

(d) Classes of goods and wastes having dangerous properties not covered by existing classification (Italy) (4)

(e) Review of Class 8 (CEFIC, Germany) (5)

(f) Classification of flammable liquids (Australia, Germany, ISO, United Kingdom) (5)

(g) Amendments to N.O.S. entries (OCTI) (5)

(h) Multi-modal tank tables (United States of America, IMO) (4)

(i) Excepted/limited quantities (United States of America) (5)

(j) Harmonization with IMO (IMO) (4)

(k) Lithium batteries (Canada, United States of America) (5)

(l) Test methods for Division 5.1 (France) (5)

(m) Routine listing and classification

(n) Liaison with other international bodies

(o) Presentation of the Recommendations

(p) Other business

108. The Committee agreed that the items marked (4) should, so far as practicable, be dealt with at the Fourth Session of the Sub-Committee in July 1991, items marked (5) at the Fifth Session in December 1991 with all items reviewed a second time at the Sixth Session in July 1992. The Committee also agreed only to deal with urgent new matters at its Seventeenth Session in December 1992.

109. It was agreed that the following documents should be carried forward to future sessions of the Sub-Committee: ST/SG/AC.10/C.3/R.9/Rev.1; -/C.3/R.13; -/C.3/R.60/Rev.1; -/C.3/R.63; -/C.3/R.94; -/C.3/R.101; -/C.3/R.101/Rev.1; -/C.3/R.111; -/C.3/R.112; -/C.3/R.132; -/C.3/R.143; ST/SG/AC.10/R.288; -/R.285; -/R.313.

CALENDAR OF MEETINGS FOR THE BIENNIUM 1991-1992

110. The Committee was advised that the following periods have been allocated for their sessions during the next biennium:

1-12 July 1991	Sub-Committee of the Economic and Social Council of Experts on the Transport of Dangerous Goods (fourth session)
2-13 December 1991	Sub-Committee of the Economic and Social Council of Experts on the Transport of Dangerous Goods (fifth session)
6-17 July 1992	Sub-Committee of the Economic and Social Council of Experts on the Transport of Dangerous Goods (sixth session)
7-16 December 1992	Committee of the Economic and Social Council of Experts on the Transport of Dangerous Goods (seventeenth session)

111. These dates were based on availability of facilities and the need to achieve an even distribution of meetings serviced by the ECE secretariat. Experts were reminded that for documents to be correctly processed for the next session of the Sub-Committee, they would need to reach Geneva by 15 April 1991.

112. The Chairman suggested that heads of delegations of Committee Members should discuss with the Director of the Transport Division the question of the chairmanship of future sessions of the Sub-Committee. The Committee invited the Director to attempt to establish a consensus for a nomination.

ANY OTHER BUSINESS

113. Following the discussion of future work on Class 1 recorded in paragraph 30, the following documents were considered: ST/SG/AC.10/R.291, -/R.295, -/R.308, -/316, -/R.330 and -/R.341. The expert from the Netherlands explained that, on reflection, he would withdraw his documents ST/SG/AC.10/C.2/R.671, -/C.2/R.672 and ST/SG/AC.10/C.3/R.72/Rev.2 and replace them with updated proposals. In document ST/SG/AC.10/R.291 the expert from the United Kingdom asked for guidance on dealing with related substances in Division 4.1, but the Committee did not consider this merited inclusion. In document ST/SG/AC.10/R.295 the expert from the United States of America made a number of suggestions, some of them new. The Committee accepted all items except the proposed development of hazard levels for gases. The Committee agreed that the reprocessing of metal drums should be included in a review of chapters 9 and 16, as proposed in documents ST/SG/AC.10/R.295 and -/R.330 from the expert from the United Kingdom.

114. The suggested development of a comprehensive system of generic entries, as outlined in documents ST/SG/AC/10/R.308 and -/R.341 by the expert from the Netherlands was discussed in depth. Most experts considered that for the time being activity in this direction should be confined to the necessary minimum entailed by work in the modal forums to harmonize existing N.O.S. entries. Some experts encouraged the Netherlands' initiative as an objective for the longer term.

115. The expert from the Netherlands expressed his regret at the apparent reluctance within the Committee to take a long-term view on the development of a generic entry system for all classes. He also regretted that while classes 2, 3, 6.1 and 8 are to be reviewed by the RID/ADR Joint Meeting, this was not recognized as an opportunity to take the lead in the harmonization process between the modes.

116. In document ST/SG/AC.10/R.316 the expert from Italy proposed a working group to define classes of goods and wastes having properties not covered by the existing classification. It was recalled that UNEP was reviewing this important subject (para. 109) and the Committee invited the expert from Italy to consider this activity and to prepare specific proposals.

REPORT TO THE ECONOMIC AND SOCIAL COUNCIL

117. The Chairman read out a first draft for a resolution which the Committee might wish to submit to the Economic and Social Council, along with the report of the Committee's activities. This was based on the text of the previous resolution 1989/104.

118. The Committee again agreed to request that the Economic and Social Council consider setting up a special fund to support the Committee's activities utilizing, inter alia, the income from the sale of its publications.

119. The Committee regretted that its request for one additional professional and one additional general service staff to be made available to support its activities, contained in resolution 1983/7, 1985/7, 1985/9, 1986/66, 1987/54 and 1989/104 had not yet been implemented.

120. The Committee agreed to a draft resolution for submission to the Economic and Social Council as set out in annex 1 to this report. Members of the Committee and observers representing Governments were requested to contact their officials in regard to the work of the Committee and the resolution. In particular, representatives of Governments to the Economic and Social Council should be briefed on the subject.

121. For briefing purposes in this regard, the Committee was reminded of a document entitled "Terms of Reference of the Subsidiary Machinery of the Economic and Social Council ..." under ECOSOC number E/1983/INF.4. Topic E on page 37 provides a description of the functions and purposes of the Committee which may be helpful to representatives in New York.

TRIBUTE TO CAPTAIN H. WARDELMANN

122. The Chairman announced that Captain Hubert Wardelmann, who was unable to attend the session, would be retiring from IMO at the end of 1990 and thus would no longer represent IMO at sessions of the Committee. For 20 years he had devoted himself to improving the safety of the transport of dangerous goods, in particular by striving for the harmonization of the rules of the various international organizations. His contribution to the work of the Committee had been considerable and his presence would be sorely missed in the future. The Committee endorsed unanimously the sentiments expressed by the Chairman.

ADOPTION OF THE REPORT

123. The Committee adopted the report on its sixteenth session and the annexes thereto.

UNITED
NATIONS

ST

Secretariat

ST/SG/AC.10/17/Add.1
19 December 1990

Original: ENGLISH

COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS

REPORT OF THE COMMITTEE OF EXPERTS ON ITS SIXTEENTH SESSION
(3-12 December 1990)

Addendum 1

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Annex 1 - Draft Economic and Social Council Resolution 1991/.....

Annex 2 - Adopted text and amendments to the Manual of Tests and Criteria
(ST/SG/AC.10/11/Rev.1)

GE.90-24593/0743p

Annex 1

1991/..... Work of the Committee of Experts on the Transport of Dangerous Goods

The Economic and Social Council,

Recalling its resolutions 1983/7 of 26 May 1983, 1985/9 of 28 May 1985, 1986/66 of 23 July 1986, 1987/54 of 28 May 1987 and 1989/104 of 27 July 1989,

Noting the ever-increasing volume of dangerous goods in world-wide commerce and the rapid expansion of technology and innovation,

Bearing in mind the continuing need to meet the growing concern for the protection of life, property and the environment through the safe transport of dangerous goods while facilitating trade,

Aware that, in order to achieve internationally harmonized laws, the specialized agencies and other international organizations and interested Member States are committed to taking the recommendations of the Committee of Experts on the Transport of Dangerous Goods as a basis for the formulation of their requirements and regulations and therefore rely on the work of the Committee,

Recognizing the increasing need for co-operation with other international bodies such as the International Labour Organisation and the United Nations Environment Programme involved in activities related to the transport of dangerous goods,

Reaffirming the desirability of widening the decision-making base of the Committee by encouraging the participation of developing countries and other non-member countries in its future work,

1. Takes note of the report of the Secretary-General on the work of the Committee of Experts on the Transport of Dangerous Goods in the biennium 1989-1990 and of the new and amended recommendations approved by the Committee for inclusion in its existing recommendations;

2. Requests the Secretary-General:

(a) To incorporate in the existing recommendations of the Committee of Experts on the Transport of Dangerous Goods all the new and amended recommendations approved by the Committee at its sixteenth session;

(b) To publish the new and amended recommendations in all the official languages of the United Nations, in the most cost-effective manner, not later than the end of 1991;

(c) To circulate the new and amended recommendations immediately after their publication to the Governments of Member States, the specialized agencies, the International Atomic Energy Agency and the other international organizations concerned;

3. Invites all Governments, the specialized agencies, the International Atomic Energy Agency and the other international organizations concerned to transmit to the Secretary-General their views on the Committee's work, together with any comments they may wish to make on the amended recommendations;

4. Invites all interested Governments and the international organizations concerned, when developing appropriate codes and regulations, to take full account of the recommendations of the Committee;

5. Recommends again that adequate funding be provided to support the work of the Committee as indicated in the report of the Committee on its sixteenth session, if possible by setting up a special fund;

6. Reiterates its request to the Secretary-General to make available, within existing resources, the staff necessary for the adequate servicing of the committee, namely one additional Professional and one additional General Service post, and regrets that the requests made in its resolutions 1983/7, 1985/9, 1986/66, 1987/54 and 1989/104 have not yet been met;

7. Requests the Secretary-General to submit a report to the Council in 1993 on the implementation of the present resolution.

Annex 2

PART I

Adopted text and amendments to the Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.1).

(1) Add after Test 3 (a) (v) "Modified Type 12 Impact Tool", Test 3 (a) (vi) "Impact Sensitivity Test".

IMPACT SENSITIVITY TEST

TEST 3 (a) (vi)

1. Introduction

The test is a standard small-scale impact sensitivity test for solid and liquid explosives. The test gives quantitative results for lower sensitivity limits in roller assembly 2 for solid explosives and roller assembly 3 for liquid explosives.

2. Apparatus and materials

2.1. Figure 1 shows a sketch of the impact apparatus. The main components of the apparatus are:

an anvil made of seamless steel;

vertical parallel guide columns for a falling weight;

a steel weight (10 kg) with a limit stop.

The weight impact head is made of hardened steel (Rockwell C hardness is 60-63):

a catching and dropping device;

a rack which prevents the weight from repeated falling and impacting a sample on the anvil;

a measuring rule with 1 mm scale.

2.2. The test sample is placed into the roller assembly 2 or 3. Dimensions and requirements for these roller assemblies are shown in figures 2 and 3.

2.3. A laboratory balance with weighing error of not more than 0.005 g.

2.4. A hydraulic press which provides compression pressure of 290 MPa.

2.5. A dropping tube or pipette.

2.6. Standard explosive tetryl with crystal sizes 0.200-0.270 mm recrystallized from acetone.

3. Procedure

3.1. Solid substances

3.1.1. As a rule substances should be tested as received. Wetted substances should be tested with the minimum quantity of humidifier required for transport. The substances should then be subjected to the following procedures:

(a) granulated, flaky, pressed, cast and similar substances are milled and screened; the tested substance particles should pass through a screen with 0.9-1.0 mm mesh gauge;

(b) elastic substances are cut with a sharpened knife on a wooden surface; ground particle sizes should not be more than 1 mm. Elastic substance samples are not screened;

(c) powdered and plastic explosives samples are not ground and screened.

Roller assemblies for solid samples are degreased with acetone or ethyl alcohol. Prepared test assemblies should have 0.02-0.03 mm difference between the diameters of the sleeves and the rollers. The components may be re-used if they remain within specification.

3.1.2. To determine the lower sensitivity limit of the explosive the sample with mass of 0.100 $\pm$ 0.005 g is placed on the roller surface in the opened roller of assembly 2. The sleeve should be aligned with the direction of the groove downwards. The second roller is placed on the explosive sample and the upper roller is used for smoothing it out by pressing and rotating. The assembly containing the explosive is placed on a hydraulic press, where it is compressed to a pressure of 290 MPa. For plastic, elastic and pasty explosives the pressure is preselected so that the explosive is not pressed out beyond the faces of the rollers. Wetted explosives are not compressed.

Then the sleeve with the rollers and the explosive is turned over in a tray and placed against the rollers as far as they will go. This ensures that the explosive is in contact with the sleeve groove. The assembly containing the explosive is placed on the anvil of the impact apparatus. The weight (10 kg) falls and impacts the sample. The reaction is detected by a sound effect, flash or burn traces on the rollers and sleeve. Discoloration of the sample is not considered as a sign of explosion.

3.1.3. The lower limit of explosive impact sensitivity is defined as the maximum drop height of the 10 kg steel weight which does not give positive results in 25 tests. The drop height is selected from the following range: 50, 70, 100, 120, 150, 200, 250, 300, 400, 500 mm.

Tests are carried out beginning with 150 mm drop height. If positive results are obtained at this height the test is repeated with the next lower drop height. Conversely when negative results are obtained the next higher drop height is subsequently used. Thus the maximum drop height for 10 kg mass is obtained when no positive reaction occurs in 25 tests. If, using the 50 mm drop height, positive results are obtained in 25 tests then it is established that the lower sensitivity limit of explosive tested in roller assembly 2 is < 50 mm. When no positive reactions occur in 25 tests for the 500 mm drop height, then the lower impact sensitivity limit for the explosive tested in roller assembly 2 is expressed as 500 mm or more.

3.2. Liquid substances

3.2.1. Roller assemblies 3 are degreased with acetone or ethyl alcohol. Usually 35-40 roller assemblies are prepared. The roller assemblies must have 0.02-0.03 mm difference between the diameters of sleeves and rollers.

3.2.2. To determine the lower sensitivity limit, the liquid substance is placed in the cap with a dropping tube or pipette. The cap is in the centre of the lower roller and is completely filled with the liquid substance. The second roller is carefully placed on the cap containing the liquid substance, the roller assembly is placed on the impact apparatus anvil and the steel weight (10 kg) is dropped. The result is noted.

3.2.3. The lower limit of the explosive impact sensitivity is defined as a maximum drop height of the 10 kg steel weight which does not give positive results in 25 tests. The drop height is selected from the following range: 50, 70, 100, 120, 150, 200, 250, 300, 400, 500 mm.

Tests are carried out beginning with 150 mm drop height. If positive results are obtained at this height the test is repeated with the next lower drop height. Conversely when negative results are obtained the next higher drop height is subsequently used. Thus the maximum drop height for 10 kg mass is obtained when no positive reaction occurs in 25 tests. If, using the 50 mm drop height, one or more positive results are obtained in 25 tests then it is established that the lower sensitivity limit of explosive tested in roller assembly 3 is < 50 mm. If no positive reaction occurs in 25 tests for the 500 mm drop height, then the lower impact sensitivity limit for the explosive tested in roller assembly 3 is expressed as 500 mm or more.

4. Criteria and method of assessing results

4.1. A solid substance is too hazardous for transport if the lower impact sensitivity in assembly 2 is < 100 mm and is noted as "+".

4.2. A liquid substance is too hazardous for transport when the lower impact sensitivity in assembly 3 is < 100 mm and is noted as "+".

5. Examples of results

5.1. Solid substances

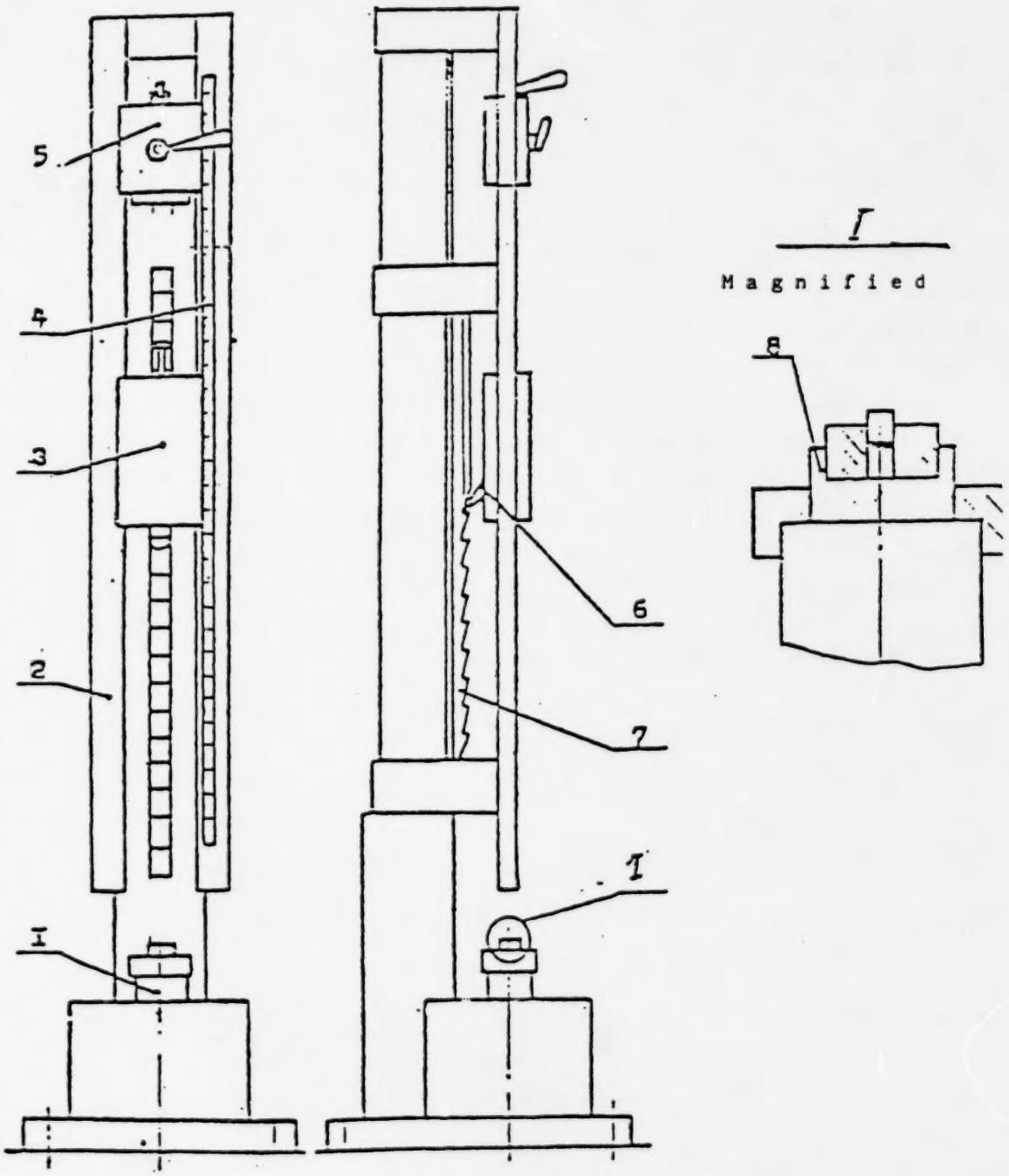
Table 1

Substance	Lower limit in assembly 2, mm	Result
Pentaerythritol tetranitrate (dry)	50	+
Pentaerythritol tetranitrate/paraffin 95/5	70	+
Pentaerythritol tetranitrate/paraffin 90/10	100	-
Pentaerythritol tetranitrate/water 75/25	100	-
Cyclotrimethylenetrinitramine (dry)	70	+
Cyclotrimethylenetrinitramine/wax 95/5	120	-
Cyclotrimethylenetrinitramine/water 85/15	150	-
Cyclotetramethylenetrinitramine (dry)	70	+
Tetryl	100	-
Trinitrotoluene	> 500	-
Granulite AS-8 (91.8% of ammonium nitrate, 4.2% of machine oil, 4% of aluminium)	> 500	-
Picric acid	> 500	-
Ammonal (80.5% of ammonium nitrate, 15% of trotyl, 4.5% of aluminium)	150	-
Ammonite 6ZhV (79% of ammonium nitrate, 21% of trotyl)	200	-
Ammonite T-19 (61% of ammonium nitrate, 19% of trotyl, 20% of sodium chloride)	300	-
Splitting ammonal N 1 (66% of ammonium nitrate, 24% of hexogen, 5% of aluminium)	120	-

5.2. Liquid substances

Table 2

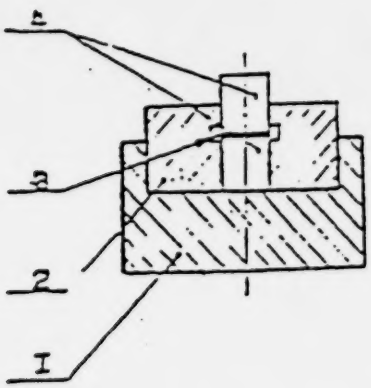
Substance	Lower limit in assembly 3, mm	Result
Nitroglycerine	< 50	+
Nitromethane	> 500	-
Isopropyl nitrate	> 500	-
Bis (2,2-dinitro-2-fluoro-ethyl) formal/methylene chloride 65/35	400	-



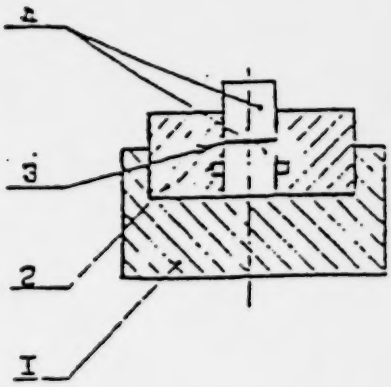
1 - anvil; 2 - column; 3 - weight; 4 - rule; 5 - catching and dropping device; 6 - stop; 7 - rack; 8 - roller assembly.

Fig. 1. Impact apparatus

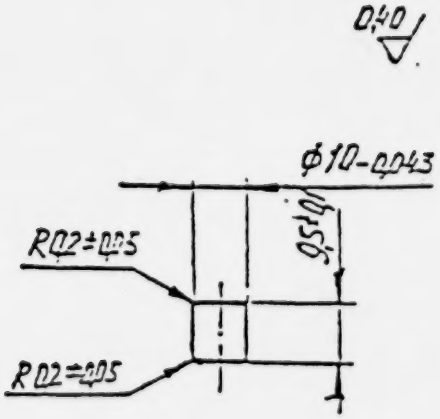
Sleeve position
"groove facing upwards"



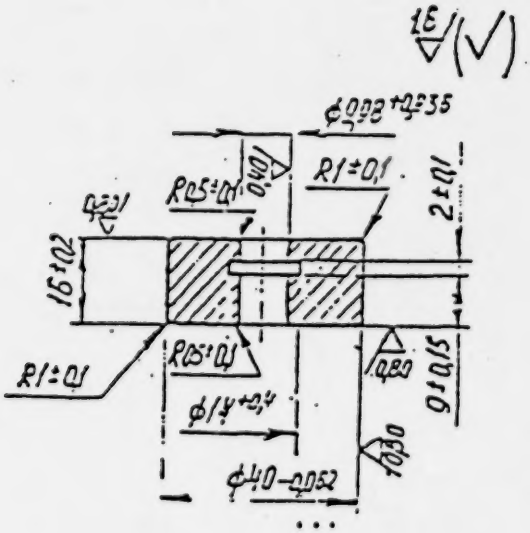
Sleeve position
"groove facing downwards"



1 - tray; 2 - sleeve; 3 - sample; 4 - roller

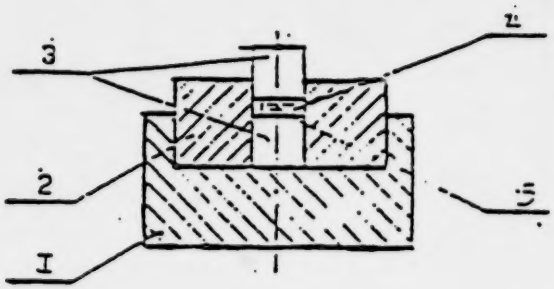


HRC 63 ... 66
Material: ball bearing steel
R o l l e r

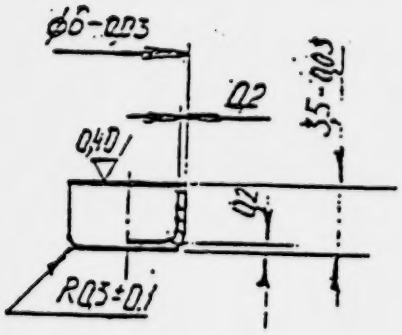


HRC 57 ... 61
Material: tool carbon steel
S l e e v e

Fig. 2. Roller assembly 2



1 - tray; 2 - sleeve; 3 - roller;
4 - cap; 5 - sample



Material: copper M2
Coating: nickel plating. 3 microns

Fig. 3. Roller assembly 3

(2) Add after "Test 3 (b) (ii) Rotary Friction Test", "Test 3 (b) (iv) Friction Sensitivity Test" as follows:

FRICTION SENSITIVITY TEST

TEST 3 (b) (iv)

1. Introduction

This is a small-scale friction sensitivity test for solid and powdered explosives. This test enables quantitative results to be obtained for lower limits of sensitivity.

2. Apparatus and materials

2.1. The general scheme of the friction test apparatus is given in figure 1. The apparatus consists of four main components: pendulum, pendulum holder, apparatus body and hydraulic press. The apparatus is mounted on a concrete base. The roller assembly 1 with explosive under test is placed in the apparatus body. The compression of the explosive sample placed between the two rollers, up to the prescribed pressure, is carried out by means of the hydraulic press. Then the movement of the upper roller along the test substance by 1.5 mm is carried out using the pendulum weight impact.

2.2. The roller assembly 1 consists of a sleeve and two rollers. Dimensions and requirements for it are shown in figure 2.

3. Procedure

3.1. As a rule substances should be tested as received. Wetted substances should be tested with the minimum quantity of humidifier required for transport. The substances should then be subjected to the following procedures:

(a) Granulated, flaky, pressed, cast and similarly packed substances are milled and screened; tested substance particles should pass through two screens with 0.50 ± 0.05 mm mesh gauge;

(b) Elastic substances are cut with a sharpened knife on a wooden surface; ground particle sizes should be not more than 1 mm. Elastic substance samples are not subjected to screening;

(c) Powdered, plastic and pasty explosives samples are neither ground nor screened.

Before use the roller assemblies are degreased with acetone or ethyl alcohol. The devices may be used again if they remain within specifications.

3.2. To determine the lower friction sensitivity limit of the explosive the sample of mass 0.020 + 0.002 g is placed in the open roller assembly. By gently pressing and turning the upper roller the explosive sample is evenly smoothed between the rollers. The roller assembly containing the sample is placed in the chamber of the apparatus body where it is compressed up to the chosen pressure. The sleeve is lowered by maintaining the pressure so that

the explosive sample pressed between the roller faces is raised above the sleeve. Then a striking pin is transferred so that its impact end touches the roller. The striking pin is impacted by the pendulum weight causing friction between the upper roller and the sample. The roller movement is 1.5 mm. The throw-off angle for the pendulum is chosen according to the table, depending upon the retaining pressure of the sample. The tests are performed until the maximum retaining pressure is found which does not give any explosion in 25 tests. An explosion is considered as a substance transformation accompanied by sound effect, flash or burn traces on the rollers. The lower friction sensitivity limit is considered as the maximum retaining pressure which gives no explosions in 25 tests and which distinguishes from the pressure which still gives explosions but differ by not more than:

10 MPa - at test pressure up to 100 MPa

20 MPa - at test pressure (100 ... 400) MPa

50 MPa - at test pressure above 400 MPa.

If no explosion is obtained in 25 tests at a pressure of 1,200 MPa, the lower friction sensitivity limit is expressed as "1,200 MPa or more". If one or more explosions are obtained in 25 tests at a pressure of 30 MPa, the lower friction sensitivity limit is expressed as "less than 30 MPa".

4. Criteria and methods of assessing results

A substance is considered too dangerous for transport if the lower impact friction sensitivity limit is less than 200 MPa. It is denoted by sign "+".

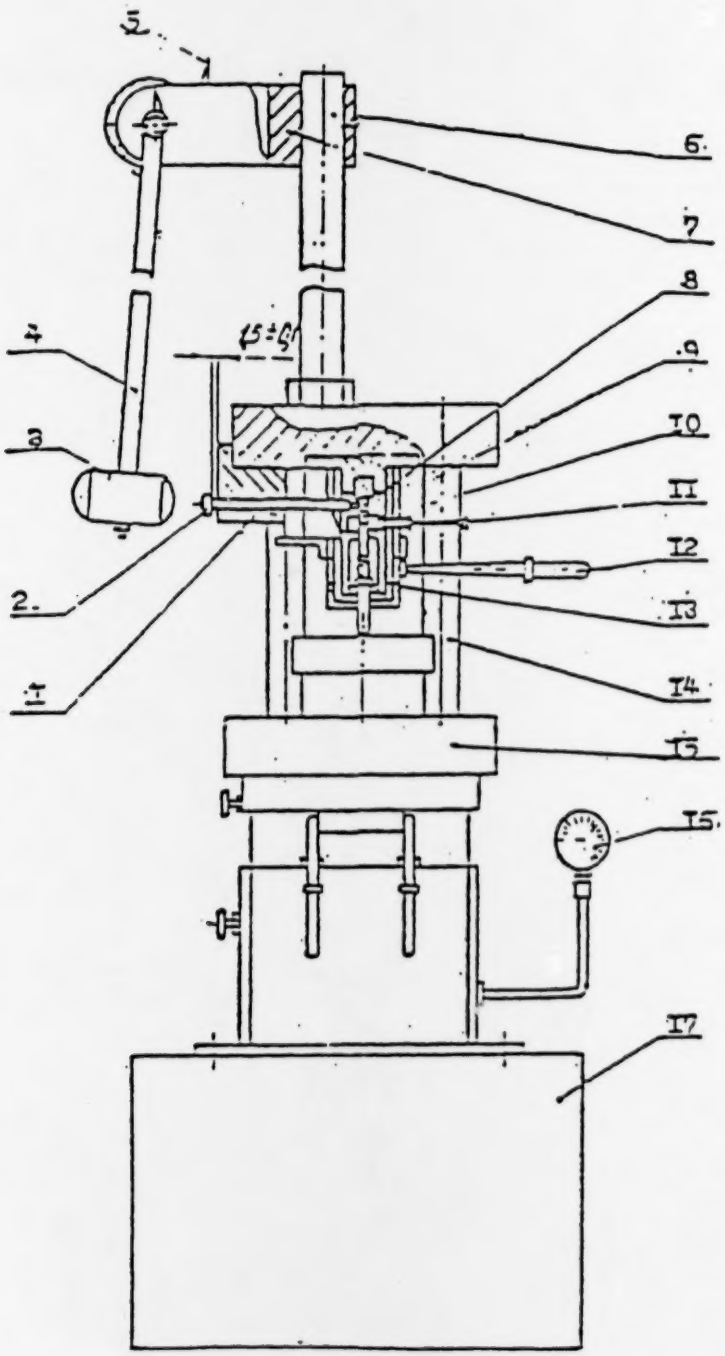
5. Examples of results

Explosive	Lower limit, MPa	Result
Pentaerythritol tetranitrate (dry)	150	+
Pentaerythritol tetranitrate/paraffin, 95/5	350	-
Pentaerythritol tetranitrate/TNT, 90/10	350	-
Pentaerythritol tetranitrate/water, 75/25	200	-
Cyclotrimethylenetrinitramine (dry)	250	-
Cyclotrimethylenetrinitramine/water, 85/15	350	-
Cyclotetramethylenetetranitramine (dry)	200	-
Cyclotetramethylenetetranitramine/water, 85/15	350	-
Picric acid	450	-
Trinitrotoluene	600	-
Lead azide	30	+
TATB	900	-
Ammonium nitrate	1 200	-

Table 1

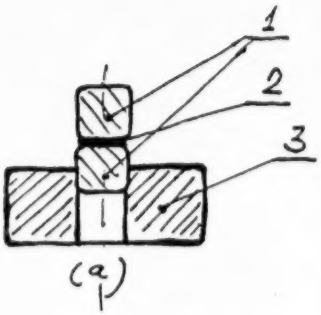
RELATIONSHIP BETWEEN RETAINING PRESSURE OF EXPLOSIVE SAMPLE AND THROW-OFF ANGLE OF PENDULUM PROVIDING THE CONSTANT VALUE OF ROLLER SHIFT

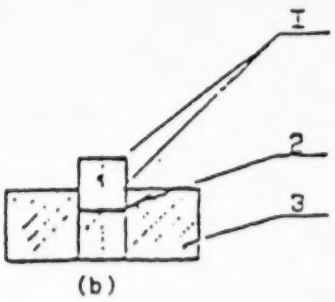
Retaining pressure of explosive sample, MPa	Throw-off angle of pendulum, ° (from a vertical)
30	28
40	32
50	35
60	38
70	42
80	43
90	46
100	47
120	54
140	58
160	61
180	64
200	67
220	70
240	73
260	76
280	78
300	80
320	82
340	83
360	84
380	85
400	86
450	88
500	91
550	93
600	95
650	97
700	100
750	101
800	103
850	106
900	107
950	108
1 000	110
1 100	115
1 200	118



1 - guide of striking pin; 2 - striking pin; 3 - pendulum weight; 4 - pendulum lever; 5 - trigger; 6 - pendulum holder support; 7 - pendulum holder; 8 - chamber; 9 - roller; 10 - sleeve; 11 - roller assembly pusher; 12 - handle for sinking of roller assembly sleeve; 13 - apparatus body; 14 - apparatus support; 15 - hydraulic press; 16 - pressure gauge; 17 - base

Fig. 1. Apparatus for impact friction test

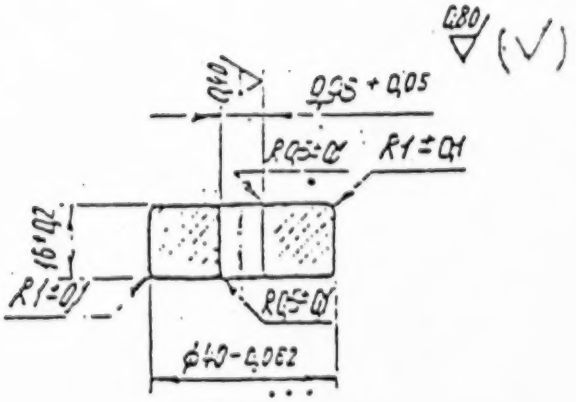




1 - roller; 2 - explosive sample;
3 - sleeve

(a) Initial position of rollers

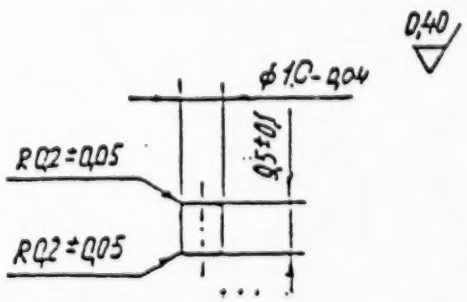
(b) Rollers in position for test



HRC 57 ... 61

Material: tool carbon steel

sleeve



HRC 63 ... 66

Material: ball bearing steel

Roller

Fig. 2. Roller assembly 1

PART II

ADOPTED AMENDMENTS TO THE MANUAL OF TESTS AND CRITERIA

(ST/SG/AC.10/11/Rev.1)

1. Amend the contents of Part I as follows:

for "7 (k) Article Propagation Test UN 56"
read "7 (k) Division 1.6 Article Stack Test UN 56".

2. In paragraph 45.11:

for "e.g. Test 7 (k) 1.6 Article Propagation Test"
read "e.g. Test 7 (k) Division 1.6 Article Stack Test".

3. Amend section 46.5 to read:

"EXAMPLES OF RESULTS

Test Substance	Results	Data Reference
Composition B	+	United States sources
PBx-9502	-	United States sources
Octorane 86A	-	French sources
B 3103	-	French sources
B 3003	+	French sources

Composition B: Cast material consisting of 60% RDX and 40% TNT.
PBx 9502: Pressed material consisting of 95% TATB and 5% Kel-F.
Octorane 86A: Cast Plastic-Bonded explosive consisting of 86% HMX and 14% of an inert binder.
B 3103: Cast Plastic-Bonded explosive, consisting of 51% HMX, 19% aluminium and 30% energetic binder
B 3003: Cast Plastic-Bonded explosive, consisting of 80% HMX and 20% energetic binder."

(Amend in the French version "inerte" to read "énergétique".)

4. Amend the end of the table in section 47.5 to read:

"

Test Substance	Results	Data Reference
TNT cast	+	FS/FE/287/03/87/005
Composition B	+	United States sources
PBx-9502	-	United States sources
B 3103	+	French sources
B 3003	+	French sources

"

and delete columns 2 and 3.

5. Amend the table in section 48.5 to read:

"

Test Substance	Results	Data Reference
Composition B	+	United States sources
PBx-9502	-	United States sources
Octorane 86A	-	French sources
B 3103	+	French sources
B 3003	+	French sources

"

and delete column 2 (French version only).

6. Insert at the end of the table in section 49.5 the following:

"

Test Substance	Results	Data Reference
Composition B	+	French sources
PBx-9502	-	French sources
Octorane 86A	-	French sources
B 3103	-	French sources
B 3003	+	French sources

"

7. Amend the table in section 50.5 to read:

"

Test Substance	Results	Data Reference
Composition B	+	United States sources
PBx-9502	-	United States sources
Octorane 86A	-	French sources
B 3103	-	French sources
B 3003	+	French sources

"

8. Amend the table in section 51.5 to read:

"

Test Substance	Results	Data Reference
Composition B	+	United States sources
PBx-9502	-	United States sources
Octorane 86A	-	French sources
B 3103	-	French sources
B 3003	+	French sources

"

9. Amend the table in section 52.5 to read:

"

Test Substance	Results	Data Reference
Composition B	+	United States sources
PBx-9502	-	United States sources
Octorane 86A	-	French sources
B 3003	+	French sources

"

10. Replace the existing Test 7 (k) by the following:

"TEST 7 (k)

DIVISION 1.6 ARTICLE STACK TEST

56.1 INTRODUCTION

The stack test is used to determine whether a detonation of a possible Division 1.6 article will initiate a detonation in an adjacent-like article, as offered for transport.

56.2 APPARATUS AND MATERIALS

The experimental set-up is the same as for test 6 (b) (see para. 43.2) however without confinement. The donor article should be provided with its own means of initiation or a stimulus of similar power.

56.3 PROCEDURE

The experimental procedure is the same as for the test 6 (b) (see para. 43.3). The test is to be conducted three times, unless a detonation of an acceptor is observed.

56.4 CRITERIA AND METHOD OF ASSESSING RESULTS

Fragment data (size and number of acceptor article fragments), damage to the witness plate and crater dimensions are used to determine whether or not any acceptor has detonated. Blast data may be used to determine whether or not any acceptor has detonated. Blast data may be used to supplement this decision. For a Division 1.6 article it has to be demonstrated that no propagation (detonation of an acceptor) has occurred during the test.

Acceptor article responses identified as no reaction, burning or deflagration are considered as negative results and noted as '-'."

11. PART III. Append the following text to 2.1.2:

"A combination of a test for explosive power (any test of series F except test F.5) with a test for the effects of heating under confinement (any test of series E except test E.4) may be used as a screening procedure for assessing the ability to propagate a detonation. A test of series A need not be performed if:

a 'no' result is obtained from the explosive power test; and

a 'no' or 'low' result is obtained from the heating under confinement test."

UNITED
NATIONS

ST

Secretariat

ST/SG/AC.10/17/Add.2
19 December 1990

Original: ENGLISH

COMMITTEE OF EXPERTS
ON THE TRANSPORT OF
DANGEROUS GOODS

REPORT OF THE COMMITTEE OF EXPERTS ON ITS SIXTEENTH SESSION (3-12 December 1990)

Addendum 2

CONTENTS

Annex 3 Adopted text and amendments to the Recommendations on the Transport of Dangerous Goods (sixth revised edition) (ST/SG/AC.10/Rev.6)

Contents

Chapter 1

Chapter 2

Annex 3

Contents

Under Chapter 13, delete the reference to table 13.3

Amend the entry for Chapter 14 to read:

"General Notes .....

Division 4.1 - Flammable solids, self-reactive and related substances, and desensitized explosives .....

Figure 14.1: Flow chart for assigning readily combustible solids, except metal powders, to Division 4.1 .....

Figure 14.2: Flow chart for assigning self-reactive substances to Division 4.1 .....

Table 14.1: List of currently assigned self-reactive substances .....

Division 4.2 - Substances liable to spontaneous combustion .....

Division 4.3 - Substances which in contact with water emit flammable gases ..

Test methods and criteria for substances of Class 4 .....

Figure 14.3: Mould and accessories for the preparation of the pile for the burning rate test ....."

After Chapter 17 add:

Appendix - List of Generic and N.O.S. PROPER SHIPPING NAMES

Chapter 1

(a) Renumber paragraph 1.9 as 1.9.1 and insert a new paragraph 1.9.2 as follows:

1.9.2 Wastes should be transported under the requirements of the appropriate class considering their hazards and the criteria of these Recommendations. Wastes not otherwise subject to these Recommendations but covered under the Basel Convention may be transported under class 9.

(b) Amend paragraph 1.10 to read as follows:

"1.10 Unless there is an explicit or implicit indication to the contrary in the Recommendations, dangerous goods with a melting point of 20° C or lower at a pressure of 101.3 kPa should be considered to be liquids. A viscous substance should be subjected to the ASTM D 4359-84 test; or to the test for determining fluidity (penetrometer test) prescribed in Appendix A.3 of the United Nations publication ECE/TRANS/80 (Vol.1) (ADR) with the modifications that the penetrometer should conform to ISO standard 2137-1985 and that the test should be used for viscous substances of any class."

(c) Replace paragraphs 1.14 to 1.18 and the heading by the following:

"Class 2 gases

1.14 A gas is a substance which:

(a) at 50° C has a vapour pressure greater than 300 kPa; or

(b) is completely gaseous at 20° C at a standard pressure of 101.3 kPa.

1.15 The transport condition of a gas is described according to its physical state as:

(a) Compressed gas - a gas (other than in solution) which when packaged under pressure for transport is entirely gaseous at 20° C;

(b) Liquefied gas - a gas which when packaged for transport is partially liquid at 20° C;

(c) Refrigerated liquefied gas - a gas which when packaged for transport is partially liquid because of its low temperature;

(d) Gas in solution - compressed gas which when packaged for transport is dissolved in a solvent.

1.16 The class comprises compressed gases; liquefied gases; gas in solution; refrigerated liquefied gases; mixtures of gases; mixtures of one or more gases with one or more vapours of substances of other classes; articles charged with a gas; tellurium hexafluoride; aerosols.

1.17.1 Substances of class 2 are assigned to one of three divisions based on the primary hazard of the gas during transport.

Division 2.1 Flammable gases

Gases which at 20° C and a standard pressure of 101.3 kPa:

(a) are ignitable when in a mixture of 13 per cent or less by volume with air; or

(b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability should be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO Standard 10156/1990). Where insufficient data are available to use these methods, tests by a comparable method recognized by a national competent authority may be used.

Note. Aerosols (UN 1950) and Receptacles, small, containing gas (UN 2037) should be regarded as being in Division 2.1 when the criteria in Special Provision 63 are met.

Division 2.2 Non-flammable, non-toxic gases

Gases which are transported at a pressure not less than 280 kPa at 20° C, or as refrigerated liquids, and which:

(a) are asphyxiant - gases which dilute or replace the oxygen normally in the atmosphere; or

(b) are oxidizing - gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does; or

(c) do not come under the other divisions.

Division 2.3 Toxic gases

Gases which:

(a) are known to be so toxic or corrosive to humans as to pose a hazard to health; or

(b) are presumed to be toxic or corrosive to humans because they have an LC_{50} value equal to or less than 5,000 ml/m^3 (ppm) when tested in accordance with paragraph 6.5 (c).

Note. Gases meeting the above criteria owing to their corrosivity are to be classified as toxic with a subsidiary corrosive risk.

1.17.2 Mixtures of gases

For the classification of gas mixtures into one of the three divisions (including vapours of substances from other classes) the following principles may be used:

(a) Flammability should be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO Standard 10156/1990). Where insufficient data are available to use these methods, tests by a comparable method recognized by a national competent authority may be used;

(b) The level of toxicity is determined by either tests in accordance with paragraph 6.5 (c) or a calculation method using the following formula:

$$LC_{50}\ \text{Toxic (mixture)} = \frac{1}{\sum_{i=1}^{n} \frac{f_i}{T_i}}$$

where f_i = mole fraction of the i^{th} component substance of the mixture

T_i = Toxicity index of the i^{th} component substance of the mixture (the T_i equals the LC_{50} value when available).

When LC_{50} values are unknown the toxicity index is determined by using the lowest LC_{50} value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

(c) A gas mixture has a subsidiary risk of corrosivity when the mixture is known by human experience to be destructive to the skin, eyes or mucous membrances or when the LC_{50} value of the corrosive components of the mixture is equal to or less than 5,000 ml/m^3 (ppm) when the LC_{50} is calculated by the formula:

$$LC_{50}\ \text{Corrosive (mixture)} = \frac{1}{\sum_{i=1}^{n} \frac{f_{ci}}{T_{ci}}}$$

where f_{ci} = mole fraction of the i^{th} corrosive component substance of the mixture

T_{ci} = Toxicity index of the i^{th} corrosive component substance of the mixture (the Ti_c equals the LC_{50} value when available).

(d) Oxidizing ability is determined either by tests or by calculation methods adopted by the International Standards Organisation.

1.18 Hazard precedence

Gases and gas mixtures with hazards associated with more than one division take the following precedence:

(a) Division 2.3 takes precedence over all other divisions;

(b) Division 2.1 takes precedence over Division 2.2;

(d) In paragraph 1.21 amend the definition of Division 4.1 to read: "Solids which, under conditions encountered in transport, are readily combustible or may cause or contribute to fire through friction; self-reactive and related substances which are liable to undergo a strongly exothermic reaction; desensitized explosives which may explode if not diluted sufficiently.";

(e) In the first part of paragraph 1.23, delete the second sentence in the definition of Division 6.1;

(f) Modify second part of paragraph 1.23 to read:

"Division 6.2 Infectious substances

Substances containing viable micro-organisms including a bacterium, virus, rickettsia, parasite, fungus, or a recombinant, hybrid or mutant, that are known or reasonably believed to cause disease in animals or humans.

Note 1. Toxins from plant, animal or bacterial sources which do not contain any infectious substances or organisms or which are not contained in them should be considered for transport as UN 3172."

(g) Add "Note 2. For the purposes of these Recommendations, genetically modified substances are divided into the following groups:

(a) genetically modified micro-organisms which meet the definition of an infectious substance given above, should be classified in Division 6.2 and assigned UN 2814 or UN 2900;

(b) animals which contain, or are contaminated with, genetically modified substances that meet the definition of an infectious substance should be transported in accordance with chapter 6 and assigned UN 2814 or UN 2900;

(c) except when authorized for unconditional use by the governments of the countries of origin, transit and destination, genetically modified micro-organisms which do not meet the definition of infectious substances and which are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction, should be assigned UN 3245;

(d) genetically modified organisms, which are known or suspected to be dangerous to humans, animals or the environment, should be transported according to relevant national regulations."

(h) Table 1.1: amend footnote ** to read:

"Substances of Division 4.1 other than self-reactive and related substances and desensitized explosives."

In the table, add to row 3 III, column 6.1 III, the symbol "***"; then add a new footnote:

"*** Division 6.1 for pesticides".

(i) Add to 1.39.1 at end of the fourth sentence:

"and the name in Chapter 2 which most appropriately describes the substance should be used (see also the 'List of Generic or N.O.S. Proper Shipping Names' in the Appendix)."

(j) Add a new 1.39.3 to read:

1.39.3 All self-reactive substances accepted for transport under the provisions of Division 4.1 are assigned to one of 20 generic entries in accordance with the classification principles and flow chart described in 14.2.2.4 and Figure 14.2.

1.45 Persons engaged in the transport of dangerous goods should receive training in the contents of dangerous goods requirements commensurate with their responsibilities.

Individuals such as those who classify dangerous goods; pack dangerous goods; mark and label dangerous goods; prepare transport documents for dangerous goods; offer or accept dangerous goods for transport; carry or handle dangerous goods in transport; mark or placard or load or unload packages into or from transport vehicles, bulk packagings or freight containers; or are otherwise directly involved in the transport of dangerous goods as determined by the competent authority; should receive the following training:

(a) General awareness/familiarization training:

Each person should receive training designed to provide familiarity with the general provisions of dangerous goods transport requirements.

Such training should include a description of the classes of dangerous goods; labelling, marking, placarding and packaging, segregation and compatibility requirements; a description of the purpose and content of the transport document; and a description of available emergency response documents.

(b) Function-specific training:

Each person should receive detailed training concerning specific dangerous goods transport requirements which are applicable to the function that person performs.

(c) Safety training.

Commensurate with the risk of exposure in the event of a release and the functions performed, each person should receive training on:

(i) methods and procedures for accident avoidance, such as proper use of package-handling equipment and appropriate methods of stowage of dangerous goods;

(ii) available emergency response information and how to use it;

(iii) general dangers presented by the various classes of dangerous goods and how to prevent exposure to those hazards, including if appropriate the use of personal protective clothing and equipment;

(iv) immediate procedures to be followed in the event of an unintentional release of dangerous goods, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed.

Such training should be provided or verified upon employment in a position involving dangerous goods transport and should be periodically supplemented with retraining as deemed appropriate by the competent authority."

(k) In paragraph 1.44 amend the third item in the list to read:

"self-reactive and related substances and desensitized explosives in Division 4.1,"

(l) After paragraph 1.44 insert the following new heading and text:

"Training of dangerous goods transport workers

1.45 Persons ..."

(m) Figure 1.1 Replace Section 4.5 with:

"Is the substance a self-reactive substance (1.21*/) or an organic peroxide (1.22*/)? yes/no.

If yes, is temperature control required (11.3.5/14.2.2.5*/)? yes/no

If yes state

4.5.1 proposed control temperature (11.3.5.3*/) ... ° C

4.5.2 proposed emergency temperature (11.3.5.3*/) ... ° C".

Chapter 2

(a) Place an asterisk at the end of those proper shipping names listed in this chapter which also appear in table 13.3. For example:

"UN 2735 ALKYLAMINES, N.O.S.* or POLYALKYLAMINES, N.O.S.*, corrosive"

(b) For those N.O.S. entries in this list which include the words "gases", "liquids" or "solids" in the proper shipping name:

Change "gases", "liquids" or "solids" to "gas", "liquid" or "solid" respectively.

(c) Add at the beginning of Chapter 2:

In the list that follows:

(1) the abbreviation "N.O.S." denotes "not otherwise specified";

(2) an alternative shipping name may be shown in brackets following a proper shipping name, e.g. ETHANOL; (ETHYL ALCOHOL);

(3) an asterisk appearing after a proper shipping name indicates that, for the purposes of documentation and package marking, the name given should be supplemented with the technical name and the applicable packing group (see paragraph 13.8.4)."

(d) Delete the Notes at the foot of the first page of Chapter 2.

(e) Delete the following entries:

UN 0273, 0274, 0416, 1584, 1592, 1821, 2449, 2951, 2952, 2953, 2954, 2955, 2970, 2971, 2972, 2973, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043.

(f) Add the following new entries:

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
0491	CHARGES, PROPELLING	1.4C				E158
0492	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1.3G				E151
0493	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1.4G				E151
0494	JET PERFORATING GUNS, CHARGED, oil well, without detonator	1.4D				E140
1851	MEDICINES, LIQUID, POISONOUS, N.O.S.	6.1		109 184 221		
3155	PENTACHLOROPHENOL	6.1		43	II	
3156	COMPRESSED GAS, OXIDIZING, N.O.S.*	2.2	5.1	109		
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.*	2.2	5.1	109		
3158	GAS, REFRIGERATED LIQUID, N.O.S.*	2.2		109		
3159	1, 1, 1, 2-TETRAFLUOROETHANE	2.2				M
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE N.O.S.*	2.3	2.1	109		
3161	LIQUEFIED GAS, FLAMMABLE N.O.S.* .	2.1		109		
3162	LIQUEFIED GAS, TOXIC, N.O.S.*	2.3		109		
3163	LIQUEFIED GAS, N.O.S.*	2.2		109		
3164	ARTICLES, PRESSURIZED PNEUMATIC or HYDRAULIC (containing non-flammable gas)	2.2				
3165	AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK (containing a mixture of anhydrous hydrazine and methylhydrazine) (M86 fuel)	3	6.1 8		I	
3166	ENGINES, INTERNAL COMBUSTION, including when fitted in machinery or vehicles	9		106		

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
3167	GAS SAMPLES, NON-PRESSURIZED, TOXIC, FLAMMABLE, not deeply refrigerated	2.1		209		
3168	GAS SAMPLES, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not deeply refrigerated	2.3	2.1	209		
3169	GAS SAMPLES, NON-PRESSURIZED, TOXIC, N.O.S., not deeply refrigerated	2.3		209		
3170	ALUMINIUM DROSS	4.3		184		
3171	WHEELCHAIR, ELECTRIC with batteries.....	9		106		
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, N.O.S.*	6.1		109 185 210		
3174	TITANIUM DISULPHIDE	4.2			III	
3175	SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.*	4.1		109 216	II	
3176	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.*	4.1		109 184		M
3178	FLAMMABLE SOLID, INORGANIC, N.O.S.*	4.1		109 184		
3179	FLAMMABLE SOLID, INORGANIC, POISONOUS, N.O.S.*	4.1	6.1	109 192		
3180	FLAMMABLE SOLID, INORGANIC, CORROSIVE, N.O.S.*	4.1	8	109 192		
3181	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.*	4.1		109 184		
3182	METAL HYDRIDES, FLAMMABLE, N.O.S.*	4.1		109 184		
3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.*	4.2		109 184		
3184	SELF-HEATING LIQUID, ORGANIC, POISONOUS, N.O.S.*	4.2	6.1	109 192		

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
3185	SELF-HEATING LIQUID, ORGANIC, CORROSIVE, N.O.S.*	4.2	8	109 192		
3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.*	4.2		109 184		
3187	SELF-HEATING LIQUID, INORGANIC, POISONOUS, N.O.S.*	4.2	6.1	109 192		
3188	SELF-HEATING LIQUID, INORGANIC, CORROSIVE, N.O.S.*	4.2	8	109 192		
3189	SELF-HEATING METAL POWDERS, N.O.S.*	4.2		109 184		
3190	SELF-HEATING SOLID, INORGANIC, N.O.S.*	4.2		109 184		
3191	SELF-HEATING SOLID, INORGANIC, POISONOUS, N.O.S.*	4.2	6.1	109 192		
3192	SELF-HEATING SOLID, INORGANIC, CORROSIVE, N.O.S.*	4.2	8	109 192		
3194	PYROPHORIC LIQUID, INORGANIC, N.O.S.*	4.2		109 110	I	
3200	PYROPHORIC SOLID, INORGANIC, N.O.S.*	4.2		109 110	I	
3203	PYROPHORIC ORGANOMETALLIC COMPOUNDS, N.O.S.*	4.2		109 110	I	
3205	ALKALINE EARTH METAL ALCOHOLATES, N.O.S.*	4.2		109 184		
3206	ALKALI METAL ALCOHOLATES, N.O.S.*	4.2	8	109 192		
3207	ORGANOMETALLIC COMPOUNDS, or SOLUTIONS, or DISPERSIONS, WATER-REACTIVE, FLAMMABLE, N.O.S.*	4.3	3	109 185 222		
3208	METALLIC SUBSTANCES, WATER-REACTIVE, N.O.S.*	4.3		109 185 222		
3209	METALLIC SUBSTANCES,WATER-REACTIVE, SELF-HEATING, N.O.S.*	4.3	4.2	109 129 222		

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
3210	CHLORATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.*.....	5.1		109	II	M
3211	PERCHLORATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.*.....	5.1		109	II	M
3212	HYPOCHLORITES, INORGANIC, N.O.S.*	5.1		109	II	
3213	BROMATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.*	5.1		109	II	M
3214	PERMANGANATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.*	5.1		109 206	II	M
3215	PERSULPHATES, INORGANIC, N.O.S.*	5.1		109	III	
3216	PERSULPHATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.*	5.1		109	III	M
3217	PERCARBONATES, INORGANIC, N.O.S.*	5.1		109	III	
3218	NITRATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.*	5.1		109 184		M
3219	NITRITES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.*	5.1		103 109 184		M
3220	PENTAFLUOROETHANE	2.2				M
3221	SELF-REACTIVE LIQUID TYPE B*	4.1		181 214	II	OP1A-OP5A
3222	SELF-REACTIVE SOLID TYPE B*	4.1		181 214	II	OP1B-OP5B
3223	SELF-REACTIVE LIQUID TYPE C*	4.1		214	II	OP1A-OP6A
3224	SELF-REACTIVE SOLID TYPE C*	4.1		214	II	OP1B-OP6B
3225	SELF-REACTIVE LIQUID TYPE D*	4.1			II	OP1A-OP7A
3226	SELF-REACTIVE SOLID TYPE D*	4.1			II	OP1B-OP7B
3227	SELF-REACTIVE LIQUID TYPE E*	4.1			II	OP1A-OP8A
3228	SELF-REACTIVE SOLID TYPE E*	4.1			II	OP1B-OP8B
3229	SELF-REACTIVE LIQUID TYPE F*	4.1			II	OP1A-OP8A
3230	SELF-REACTIVE SOLID TYPE F*	4.1			II	OP1B-OP8B

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
3231	SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED*	4.1		181 194 214	II	OP1A-OP5A
3232	SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED*	4.1		181 194 214	II	OP1B-OP5B
3233	SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED*	4.1		194 214	II	OP1A-OP6A
3234	SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED*	4.1		194 214	II	OP1B-OP6B
3235	SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED*	4.1		194	II	OP1A-OP7A
3236	SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED*	4.1		194	II	OP1B-OP7B
3237	SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED*	4.1		194	II	OP1A-OP8A
3238	SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED*	4.1		194	II	OP1B-OP8B
3239	SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED*	4.1		194 213	II	OP1A-OP8A
3240	SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED*	4.1		194 213	II	OP1B-OP8B
3241	2-BROMO-2-NITROPROPANE-1,3-DIOL ..	6.1		26 132	III	
3242	AZODICARBONAMIDE	4.1		215	II	
3243	SOLIDS CONTAINING POISONOUS LIQUID, N.O.S.	6.1		109 217	II	
3244	SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	8		109 218	II	
3245	GENETICALLY MODIFIED MICRO-ORGANISMS	9		219		
3246	METHANESULPHONYL CHLORIDE	6.1	8		I	
3247	SODIUM PEROXOBORATE, ANHYDROUS ...	5.1			II	

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
3248	MEDICINES, LIQUID, FLAMMABLE, POISONOUS, N.O.S.	3	6.1	109 192 220 221		
3249	MEDICINES, SOLID, POISONOUS, N.O.S.	6.1		109 184 221		
3250	CHLOROACETIC ACID, MOLTEN	6.1	8		II	M

(g) Amend the existing entries to read as follows (where col. (a2) is blank the name is unchanged):

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
0012	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1.4S				E112
0014	CARTRIDGES, FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1.4S				E112
0015		1.2G	8	204		E102
0016		1.3G	8	204		E102
0271	CHARGES, PROPELLING	1.1C				E158
0272	CHARGES, PROPELLING	1.3C				E158
0303		1.4G	8	204		E102
0327	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1.3C				E112
0328	CARTRIDGES FOR WEAPONS, INERT PROJECTILE	1.2C				E112
0338	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1.4C				E112
0339	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1.4C				E112
0415	CHARGES, PROPELLING	1.2C				E158
0417	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1.3C				E112

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1001		2.1				
1002		2.2				
1003		2.2	5.1			M
1005		2.3	8	23		M
1006		2.2				
1008		2.3				
1009		2.2				M
1010		2.1				M
1011		2.1				M
1012		2.1				M
1013		2.2				
1014		2.2				
1015		2.2				
1016		2.3	2.1			
1017		2.3	5.1			M
1018		2.2				M
1020		2.2				M
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE	2.2				M
1022		2.2				
1023		2.3	2.1			
1026		2.3	2.1			
1027		2.1				M
1028		2.2				M
1029		2.2				M
1030		2.1				M
1032		2.1				M

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1033		2.1				M
1035		2.1				
1036		2.1				M
1037		2.1				M
1038		2.1				M
1039		2.1				
1040		2.3	2.1			M
1041		2.3	2.1			M
1043		2.2				
1044		2.2				
1045		2.3	5.1			
1046		2.2				
1048		2.3	8			
1049		2.1				
1050		2.3	8			
1053		2.3	2.1			
1055		2.1				M
1056		2.2				
1057		2.1		201		
1058		2.2				
1060		2.1				
1061		2.1				M
1062		2.3				M
1063		2.1				M
1064		2.3	2.1			M
1065		2.2				

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1066		2.2				
1067		2.3	5.1			M
1069		2.3	8			
1070		2.2	5.1			
1071		2.1				
1072		2.2	5.1			
1073		2.2	5.1			M
1075		2.1				M
1076		2.3	8			
1077		2.1				M
1078		2.2		109		
1079		2.3				M
1080		2.2				
1081		2.1				
1082		2.1				M
1083		2.1				M
1085		2.1				M
1086		2.1				M
1087		2.1				M
1198	FORMALDEHYDE SOLUTIONS, FLAMMABLE	3	8	202	III	M
1210	PRINTING INK, flammable	3		102 163 187		M
1325	FLAMMABLE SOLID, ORGANIC, N.O.S.*	4.1		109 184		M
1353	FIBRES or FABRICS IMPREGANTED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	4.1		109	III	

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1361		4.2		184 223		
1362		4.2		223	III	
1373	FIBRES or FABRICS, ANIMAL or VEGETABLE or SYNTHETIC, N.O.S, with oil	4.2		109	III	
1376		4.2		223	III	
1378	METAL CATALYST, WETTED with a visible excess of liquid	4.2		200	II	
1396		4.3		184		
1398		4.3		37 223	III	
1408		4.3	6.1	39 40 202	III	
1409	METAL HYDRIDES, WATER-REACTIVE, N.O.S.*	4.3		109 212 222		
1418		4.3	4.2	129		
1420		4.3			I	
1428		4.3			I	M
1454		5.1		208	III	M
1455		5.1			II	
1458		5.1		184		
1459		5.1		184		M
1462		5.1		109	II	
1474		5.1			III	
1475		5.1			II	
1477		5.1		109 184		
1481		5.1		109 184		

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1482	PERMANGANATES, INORGANIC, N.O.S.	5.1		109 184 206		
1483		5.1		109 184		
1489		5.1			II	
1502		5.1			II	
1506		5.1			II	
1508		5.1			II	
1511		5.1	8		III	
1566		6.1		109 184		
1581		2.3				M
1582		2.3				M
1589		2.3				
1599		6.1		184		M
1612		2.3				
1660		2.3				
1703		2.3				
1705		2.3				
1731		8		184		M
1740		8		109 184		
1741		2.3	8			
1748	CALCIUM HYPOCHLORITE, DRY or CALCIUM HYPOCHLORITE MIXTURES, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1			II	
1749		2.3	5.1 8			
1750	CHLOROACETIC ACID, SOLUTION	6.1	8		II	M

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1751		6.1	8		II	
1755		8		184		M
1757		8		184		M
1761		8	6.1	192		M
1783		8		184		M
1787		8		184		M
1788		8		184		M
1789		8		184		M
1791		8		50 51 223		M
1814		8		184		M
1819		8		184		M
1824		8		184		M
1840		8		223	III	M
1858		2.2				M
1859		2.3	8			
1860		2.1				
1911		2.3	2.1			
1912		2.2				M
1913		2.2				M
1932		4.2		223	III	
1951		2.2				M
1952		2.2				
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.*	2.3	2.1	109		
1954	COMPRESSED GAS, FLAMMABLE, N.O.S.*	2.1		109		

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1955	COMPRESSED GAS, TOXIC, N.O.S.*	2.3		109		
1956	COMPRESSED GAS, N.O.S.*	2.2		109		
1957		2.1				
1958		2.2				M
1959		2.1				
1960		2.1				
1961		2.1				M
1962		2.1				
1963		2.2				M
1964		2.1		109		
1965		2.1		109		
1966		2.1				M
1967		2.3		109		
1968		2.2		109		
1969		2.1				M
1970		2.2				M
1971		2.1				
1972		2.1				M
1973		2.2				M
1974		2.2				M
1975		2.3				
1976		2.2				M
1977		2.2				M
1978	PROPANE or PROPANE MIXTURES	2.1				M
1979		2.2				
1980		2.2				

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
1981		2.2				
1982		2.2				
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE	2.2				M
1984		2.2				
1986		3	6.1	109 129		
1988		3	6.1	109 129		
1992		3	6.1	109 129		M
2000		4.1		223	III	
2002		4.2		223	III	
2003	METAL ALKYLS, N.O.S.* or METAL ARYLS, N.O.S.*	4.2		109	I	M
2006	PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.*	4.2		76 109	III	
2009		4.2		223	III	
2020		6.1		205	III	
2034		2.1				
2035		2.1				
2036		2.2				
2044		2.1				
2073		2.2				
2186		2.3	8			
2187		2.2				M
2188		2.3	2.1			
2189		2.3	2.1			
2190		2.3	5.1			

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
2191		2.3				
2192		2.3	2.1			
2193		2.2				
2194		2.3				
2195		2.3				
2196		2.3				
2197		2.3	8			
2198		2.3				
2199		2.3	2.1			
2200		2.1				
2201		2.2				
2202		2.3	2.1			
2203		2.1				
2204		2.3	2.1			
2207		6.1		109	III	M
2209	FORMALDEHYDE SOLUTIONS, with not less than 25% formaldehyde	8			III	M
2211	POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour	9		207	III	
2257		4.3			I	M
2417		2.3				
2418		2.3				
2419		2.1				
2420		2.3				
2421		2.3	5.1	76		
2422		2.2				
2424		2.2				

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
2426	AMMONIUM NITRATE, LIQUID (hot concentrated solution)	5.1				M
2427	POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1			II	M
2428	SODIUM CHLORATE, AQUEOUS SOLUTION	5.1			II	M
2429	CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1			II	M
2451		2.3	5.1			
2452		2.1				
2453		2.1				
2454		2.1				
2455		2.2		76		
2478		3	6.1	109	II	M
2491		8		223	III	M
2495		5.1	6.1 8		I	M
2501		6.1		184		M
2517		2.1				M
2534		2.3	2.1 8			
2548		2.3	5.1 8			
2564		8		184		M
2580		8		223	III	M
2581		8		223	III	M
2582		8		223	III	M
2591		2.2				M
2599		2.2				
2600		2.3	2.1			

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
2601		2.1				
2602		2.2				M
2626	CHLORIC ACID, AQUEOUS SOLUTION, with not more than 10% chloric acid	5.1			II	M
2676		2.3	2.1			
2677		8		184		M
2679		8		184		M
2681		8		184		M
2741		5.1	6.1		II	
2813	WATER-REACTIVE SOLID, N.O.S.*	4.3		109 185 222		
2817		8	6.1	192		M
2818		8	6.1	192		M
2821		6.1		184		M
2837		8		184		M
2845	PYROPHORIC LIQUID, ORGANIC, N.O.S.*	4.2		109 110	I	
2846	PYROPHORIC SOLID, ORGANIC, N.O.S.*	4.2		109 110	I	
2857		2.2		119		
2869		8		184		
2878		4.1		223	III	
2881		4.2		185 200		
2901		2.3	5.1 8			
2925	FLAMMABLE SOLID, ORGANIC, CORROSIVE, N.O.S.*	4.1	8	109 192		

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
2926	FLAMMABLE SOLID, ORGANIC, POISONOUS, N.O.S.*	4.1	6.1	109 192		
2965		4.3	3 8		I	M
3049	METAL ALKYL HALIDES, N.O.S.* or METAL ARYL HALIDES, N.O.S.*	4.2		109	I	M
3050	METAL ALKYL HYDRIDES, N.O.S.* or METAL ARYL HYDRIDES, N.O.S.*	4.2		109	I	M
3057		2.3	8			
3070		2.3				
3083		2.3	5.1			
3085	OXIDIZING SOLID, CORROSIVE, N.O.S.*	5.1	8	109 129		
3087	OXIDIZING SOLID, POISONOUS, N.O.S.*	5.1	6.1	109 129		
3088	SELF-HEATING SOLID, ORGANIC N.O.S.*	4.2		109 184		
3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.*	8	4.3	109 130 222		
3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.*	8	4.3	109 130 222		
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.*	5.1	8	109 129		
3099	OXIDIZING LIQUID, POISONOUS, N.O.S.*	5.1	6.1	109 129		
3100	OXIDIZING SOLID, SELF-HEATING, N.O.S.*	5.1	4.2	76 109 130		
3121	OXIDIZING SOLID, WATER-REACTIVE, N.O.S.*	5.1	4.3	76 109 130 222		

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
3123	POISONOUS LIQUID, WATER-REACTIVE, N.O.S.*	6.1	4.3	109 130 222		
3125	POISONOUS SOLID, WATER-REACTIVE, N.O.S.*	6.1	4.3	109 130 222		
3126	SELF-HEATING SOLID, ORGANIC, CORROSIVE, N.O.S.*	4.2	8	109 192		
3127	SELF-HEATING SOLID, OXIDIZING, N.O.S.*	4.2	5.1	76 109 192		
3128	SELF-HEATING SOLID, ORGANIC, POISONOUS, N.O.S.*	4.2	6.1	109 192		
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.*	4.3	8	109 129 222		
3130	WATER-REACTIVE LIQUID, POISONOUS, N.O.S.*	4.3	6.1	109 129 222		
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.*	4.3	8	109 129 222		
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.*	4.3	4.1	109 129 222		
3133	WATER-REACTIVE SOLID, OXIDIZING, N.O.S.*	4.3	5.1	76 109 192 222		
3134	WATER-REACTIVE SOLID, POISONOUS, N.O.S.*	4.3	6.1	109 129 222		
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.*	4.3	4.2	109 129 222		
3136		2.2				

(a1)	(a2)	(b1)	(b2)	(b3)	(c1)	(c2)
3137	OXIDIZING SOLID, FLAMMABLE, N.O.S.*	5.1	4.1	76 109	I	
3138		2.1				M
3139	OXIDIZING LIQUID, N.O.S.*	5.1		109 184		
3148	WATER-REACTIVE LIQUID, N.O.S.*	4.3		109 185 222		
3150		2.1				
3153		2.1				
3154		2.1				